Southern Power & Industry

The Industrial and Power Journal of the South west

University Microfilms
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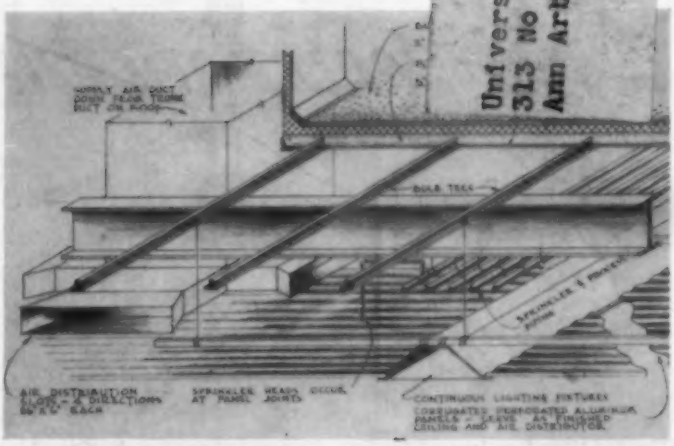
MARCH, 1958

SPI . . . 55th Year

REACHES industrial plants (manufacturing, process, utility and large service) in the South & Southwest.

SERVES plant managers, superintendents, engineering department heads and plant operating staffs.

PROVIDES information to solve design, installation, operating and plant maintenance problems.



IN SPERRY RAND's Florida plant, process piping, electrical conduit and air conditioning ducts are between suspended ceiling and roof. Design offers production and maintenance economies — See Page 38.

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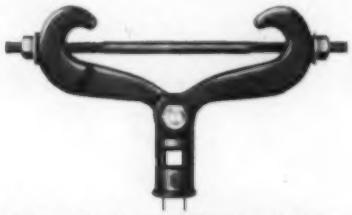
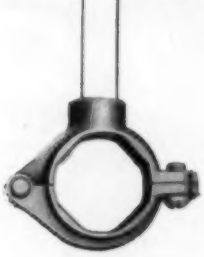
RUGGED STRENGTH... LESS WEIGHT



Grinnell *MALLEABLE IRON* Pipe Hangers



The fluidity of molten white iron allows casting of malleable pipe hangers in any desired form. Such hangers, designed in a manner consistent with the best malleable practice, are cast so closely to dimensions that subsequent shaping is not required.

Controlled annealing in the most modern equipment is employed to produce hangers having uniform internal grain structure, superiority ductility, high strength and freedom from casting strains. Quality controls in our foundries — such as hourly checks of metal, daily photomicrographs of metallurgical structure, tensile tests of sample bars from each melt — insure the rugged, lightweight strength of Grinnell malleable iron pipe hangers.

This start-to-finish manufacture by Grinnell assures malleable iron pipe hangers with a minimum safety factor of 5 or more, based on the ultimate tensile strength of the material.

The A.S.A. Code permits the use of malleable iron pipe clamps, embracing the pipe, when the temperature of the pipe does not exceed 450°F. When it does exceed this temperature, malleable iron may still be used in beam clamps, hanger flanges and the like if the malleable part is 12 inches or more distant from the pipe.

Testing metal structure with photomicrograph

***Every* Grinnell Malleable Iron Pipe Hanger offers . . .**

- Safety Factor of at least 5
- Thickness of metal increased at points of concentrated stress
- Homogeneous metal composition throughout
- Extremely high resistance to impact and corrosion
- Economy
- Heat resistance up to 450°F

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Volume 76 Number 3

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Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

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Facts and Trends

March 1, 1958

◆ MORE PLANTS & MORE MONEY — 65% of new chemical construction planned for '58-'59 is in the South & Southwest with Texas, Louisiana and West Virginia leading the country. For details on the continued chemical boom and other new multi-million industrial plants, see pages 6-16.

◆ PLANT DESIGN — In Sperry Rand Corporation's Florida plant, process piping, electrical conduit and air conditioning ducts are located between a suspended ceiling and the roof. Ceiling panels (Reynolds Metals Company's perforated prepainted aluminum panels) can be easily removed and washed. Utility piping, etc., remain clean but fully accessible through the removable ceiling panels. Check pages 38-42 on how the plant design offers production and maintenance economies.

◆ HOW MUCH DOES LIGHTING COST? Too often we assume that lighting costs are represented only by the cost of lamps purchased or by the cost of electric current. Pages 67-70 will show you exactly where your lighting dollar goes. This is Part 7 of SPI's extensive series of 13 articles on industrial lighting.

◆ POWER DISTRIBUTION — On page 37 engineers of two huge Texas refineries comment on underground distribution problems and the use of aerial cables.

◆ RETIREMENT — 62? . . 65? . . 66? . . ? Suppose you employed 100 non-skilled and semi-skilled workers as laborers, foundry helpers, etc. Most of them have been with you from 15 to over 40 years. Your company's normal retirement age is 66 but was recently lowered to 62 for men whose work is predominently physical.

The lower retirement age was thought essential to prolong employees' lives and to assure the company of a full day's work. Now the union is protesting the ruling as discriminatory. How would you handle the situation? Check SPI's Management Clinic — page 35 — for suggestions.

◆ NO LONGER A CURIOSITY — When the first gas turbine generating set went into operation some eight years ago, it was viewed "almost as a curiosity" by most of the power industry. Today, successful applications are varied and companies are seriously studying gas turbine advantages.

The first plant in the country to be designed as a combined GAS TURBINE-STEAM TURBINE generator unit is now reaching completion stage at Crisp County Power Commission's Warwick, Georgia plant. Design highlights are featured on pages 46-48.

◆ EXPLOSION HAZARDS — The costs of explosions CAN'T be budgeted . . . THEIR PREVENTION CAN. Is someone in your plant assigned the responsibility of determining what constitutes an explosion hazard? What hazards exist?

Check Up — Now! Answer the questions on page 50 and then study the evaluation on page 52. You can easily locate the hidden probabilities of electrically ignited explosions in your own plant.

Insist on the EXTRA SAFETY A-B combination starters provide

SAVE INSTALLING TIME TOO!

Install modern Allen-Bradley Bulletin 712 combination starters instead of separate starters and disconnect switches. For only with both units in one cabinet can you have *positive* "safety" *protection* against a "hot" motor starter.

The Bulletin 712 is "safety engineered"—the cabinet door cannot be opened unless the operating handle is in the "OFF" position—and it can be locked "OFF" with up to three padlocks. And, you can see that the starter is "dead" because *all three* contacts of the disconnect switch are plainly visible when in the "OFF" position. Also, the incoming line terminals are covered—there's no chance of accidental contact with a "hot" connection. The Bulletin 713—with the same "safety" design—uses an ITE circuit breaker.

Allen-Bradley combination starters take less time to install than separate units . . . and this saves money. Insist on A-B Bulletin 712-713 combination starters. Write for catalog, today.

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NEWS for the South & Southwest

New Chemical Construction 65% in South and Southwest

Texas, Louisiana and West Virginia Lead Country in '58-'59 Planned Construction

Approximately $3.84 billion, representing 750 projects in 42 states, will be spent during 1958 and 1959 for the construction of chemical-producing facilities in the country, according to a recent report of the Manufacturing Chemists' Association.

Over 65% of this total — or $2.5 billion — will be spent in the booming South and Southwest. Texas has the highest total investment for planned construction, under construction and completed '57 construction. Louisiana is second and West Virginia is third. Others in the top 10 are Ohio, California, New Jersey, Florida, Tennessee, Pennsylvania, and Illinois.

Estimates given are based on activities of companies comprising the chemical industry and operations of firms identified primarily with other fields — rubber and oil companies. Estimates do not include costs for offices, warehouses, or other service facilities.

Texas — Approximately $492 million will be spent during '58 and '59 for 37 projects already begun and 18 projects scheduled for early launching and completion before 1960. Construction for general organic chemicals leads in the classification by category, synthetic rubber is second. Other categories, in order, plastics and resins, metals, general inorganics, fertilizer chemicals, petrochemicals, and laboratories.

Louisiana — About $430 million will be spent for 20 projects already begun and 8 projects scheduled. Production of special metals leads by category followed by general organics, inorganics, synthetic rubber, petrochemicals, plastics and resins and fertilizer chemicals.

West Virginia — Twenty-one projects under construction and 7 planned and scheduled for completion by 1960 account for a $226 million expenditure in West Virginia. Chemical production is the largest manufacturing industry in the state, as it also is in Texas and Louisiana.

Primary considerations in the location of chemical-producing facilities, according to the MCA, generally are the same as those for other industries — availability of raw materials and labor, proximity to prime markets and adequate transportation.

Regionally, the West South Central States (Arkansas, Louisiana, Texas and Oklahoma) lead in total construction. The South Atlantic States (Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida) rank second.

Chemical Industry Construction Expenditures

(Includes totals of projects completed in 1957, plus those under construction and those definitely planned.)

State	Construction Cost (by $1,000's)
Alabama	$ 31,125
Arkansas	6,320
Delaware	4,200
Florida	144,675
Georgia	61,900
Kansas	11,700
Kentucky	66,405
Louisiana	493,977
Maryland	26,800
Mississippi	48,250
Missouri	39,000
North Carolina	82,925
Oklahoma	57,000
South Carolina	5,100
Tennessee	127,600
Texas	864,780
Virginia	84,600
West Virginia	278,200
Total	$2,434,557
Other States	1,337,233
TOTAL	$3,771,790
Unspecified Areas	73,650
Total U. S. A.	$3,845,440

Per Cent of Total in South and Southwest: $\frac{2,434,557}{3,771,790} = 65\%$

Expenditures by Category

Category	Total (by $1,000's)
Fertilizer Chemicals	$ 210,875
Inorganic Chemicals	710,521
Organic Chemicals	987,019
Metals	614,825
Petrochemicals	242,415
Plastics and Resins	451,440
Synthetic Rubber	297,780
Textile Fibers	161,000
Laboratories	107,215
Miscellaneous	62,350
TOTAL	$3,845,440

Florida Plant for National Wire Prod.

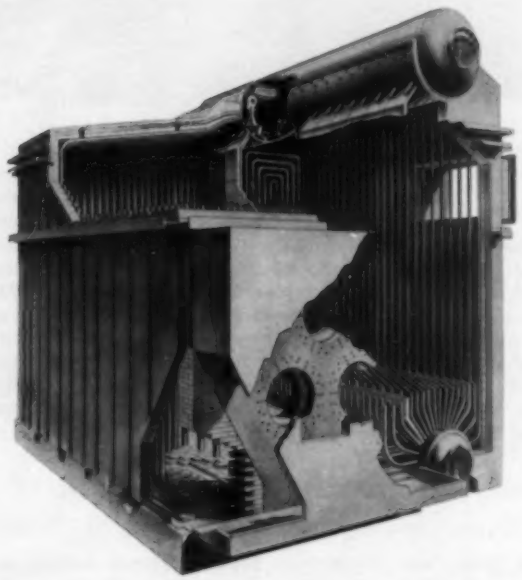
Production is scheduled in April at **National Wire Products Corporation's** new Tampa, Florida plant. Company will manufacture welded wire concrete reinforcement fabrics on automatic pressure-resistance welding equipment. Florida Steel Buildings, Inc. were the general contractors for the plant.

Here's why you get

IMPORTANT SAVINGS in

- ✔ *first cost*
- ✔ *installation*
- ✔ *operation*
- ✔ *maintenance*

with the FW Series "SC" STANDARD BOILER



THESE nine Foster Wheeler design features add up to substantial savings in the cost of steam generation. Equally important is the extra *dependability* that's built into every "SC" unit — the result of over 60 years of experience in the design and construction of large, high-pressure steam generators for leading central station power plants.

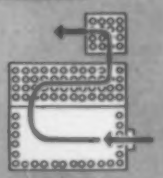
Pre-engineered in all details and standardized for economy, these FW standard steam generators are available for oil or gas firing, in capacities from 50,000 to 150,000 lb/hr, for pressures to 1500 psi and superheated steam temperatures to 950 F. For complete information, send for Bulletin B-55-4. *Foster Wheeler Corporation, 666 Fifth Ave., New York 19, N. Y.*

1. COMPLETELY WATER-COOLED WALLS

All furnace walls are cooled by closely-spaced tubes, minimizing setting maintenance and preventing excessive exit gas temperatures.

2. EFFICIENT FIRING ARRANGEMENT

Burner arrangement assures maximum rating without overheating furnace tubes. Rear wall is over 19 ft. from burner wall, permitting long, horizontal flame travel.



3. FULLY DRAINABLE SUPERHEATER

A completely drainable superheater permits removal of all condensed water from the elements before start-up.

4. HIGH STEAM PURITY

The normal drum internals consist of chevron dryers and a dry box. Separators may be added which make possible a steam purity of 1PPM or less.

5. UNRESTRICTED CIRCULATION

Absence of headers provides free circulation through integral risers and downcomers, eliminating header handhole plates and gaskets.

6. BOTTOM SUPPORTED UNIT

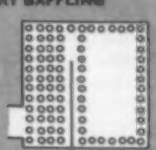
The bottom-supported design fully utilizes the structural strength of the tubes and provides low unit stresses in all members.

7. PRESSURE-TIGHT CASING

The all-welded casing forms a rigid, pressure-tight unit that can be arranged for pressurized or balanced draft operation.

8. MINIMUM REFRACTORY BAFFLING

The wall separating furnace and boiler bank is the only refractory baffling used. It is completely accessible from the furnace.



9. SIMPLE SOOT BLOWER ARRANGEMENT

Soot blowers are supported on the outer row of boiler-bank tubes, simplifying alignment and providing easy access.

FOSTER WHEELER

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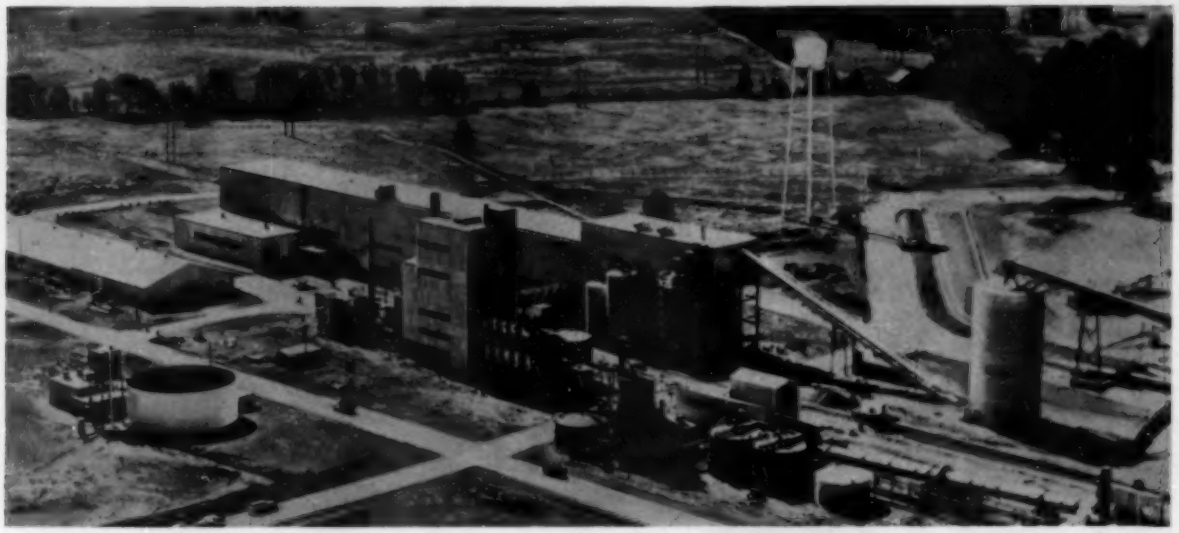

NEW $12 MILLION ARKANSAS PAPER MILL IN PRODUCTION

Dierks Paper Company, Hot Springs, Arkansas, has announced the completion of its new $12,000,000 plant at **Pine Bluff, Arkansas.** Production of kraft paper and liner board, 30 to 90 lb, has begun in the new plant, located on a 1500-acre site above the Arkansas River.

F. H. Dierks is president, and **J. C. Plumlee** is general superintendent of the new paper plant. **R. L. Richey** has been named as plant engineer, and **J. C. Causey** is assistant to plant engineer. Chief Chemist is **M. J. Cook;** chief electrician is **R. A. Scott.**

Dierks Forests, Inc. is the parent company of Dierks Paper Company; the company has been associated with Southern Pine for many years. They are now the nation's leading producer of Southern Pine lumber, with mills at Wright City and Broken Bow, Oklahoma, and Dierks and Mountain Pine, Arkansas. Timber reserves of the Dierks company consist of over $1,500,000 acres of growing timber in southeastern Oklahoma and southwestern Arkansas, one of the largest bodies of privately owned and forester-supervised timber in the country. Chips from the various Dierks sawmills are transported to the paper plant on one of the company-owned railroads the DeQueen and Eastern, connecting with an extension of the Missouri Pacific.

FOUR NEW J-M SOUTHERN PLANTS ON LINE IN '58

Four new ultra-modern Southern and Southwestern plants of **Johns-Manville** will be coming on the J-M production line with full operation scheduled during 1958.

Natchez, Mississippi — The new J-M hardboard plant has a productive capacity of 45,000,000 sq ft annually. Mechanized plant, operated by 110 employees, utilizes 15,000 cords of pulpwood each year and marks entrance of Johns-Manville into the fast-growing hardboard industry. It is the Company's second plant at Natchez.

Marrero, Louisiana — New floor tile plant, with capacity of 35,000,000 sq ft annually, is operated by 100 employees. It is the Company's third floor tile plant, and the second J-M plant at the New Orleans location.

Denison, Texas — A new 166,000 sq ft Transite asbestos-cement pipe plant is operated by 270 employees.

Savannah, Georgia — Johns-Manville's asphalt shingle and roll roofing plant is fully automated and operates with about 100 employees. On a 58-acre tract, it has 126,000 sq ft of production space.

AMPCO METAL HAS SOUTHWEST PLANT

New foundry facilities and principal sales and services offices for the Southwest have been established by **Ampco Metal, Inc.,** Milwaukee, producer of aluminum bronzes and producers of this alloy. The new $200,000 branch foundry at Garland, Texas, near Dallas, includes sand and centrifugal foundries, heat treating facilities and some machining operations.

Ampco alloys are specially designed to combat corrosion and erosion. They are also produced with non-magnetic characteristics for safety tools and with good electrical conductivity for other applications.

Container Plant — Fla.

International Paper Company's Single Service Division is building a plant for the manufacture of Pure-Pak paper milk containers near **North Miami Beach, Florida** between Route 9 and the Seaboard Railroad, just north of the Sunshine State Parkway. Completion is scheduled for the summer of '58.

There's A Fuel Satisfaction Coal To Meet Every Industrial Requirement . . .

We'll Match You!

Matching the coal to the job isn't always easy, but Norfolk and Western *Fuel Satisfaction* specialists can help industrial coal users with this tricky problem.

Let these men tell you how *Fuel Satisfaction* can be used to lower operating costs — *and increase profits* — in plants of every type.

If you need top-quality fuel — for heat, power or special purpose — there's a *Fuel Satisfaction* coal to meet your specific requirements. Tell us your specifications — *we'll match you!*

FUEL SATISFACTION is the name given the many fine brands of superior all-purpose Bituminous Coal mined along the N&W.

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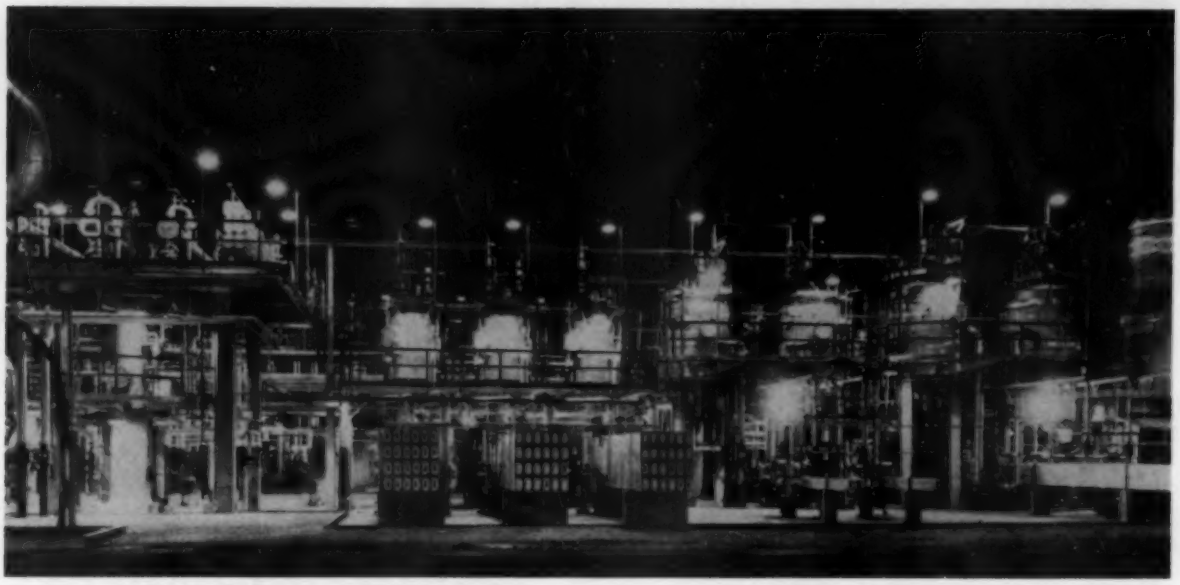


The Polymer Chemicals Division plant at Baton Rouge works around the clock. Night lighting must be just as seeworthy as day light for ease of operations and personnel safety. All handles, rungs and ladders are painted red, which shows up well under the extremely good nighttime lighting.

$18 Million Baton Rouge Petrochemical Plant on Stream

W. R. Grace & Co.'s Polymer Chemicals Division high density polyethylene plant at **Baton Rouge, Louisiana** has been on stream for the past three months. Initial production is a new plastic resin known as "Grex" — formed into uniform pellets which are packaged into 50 lb bags for shipment to plastic fabricators.

Plant has an annual capacity of 50,000,000 lb and is the largest of its kind in the world to come on stream as an integrated operating unit. The new operation is characteristic of almost complete outdoor petrochemical type construction.

Many safety features have been utilized in the graphic panel control rooms which are the magic brains of the plant. If an operator pushes the wrong button, a foolproof interlock system catches the error automatically before the process step is carried out, thus insuring quality of product.

The sprinkler system is intricately patterned so that each section can be deluged with water in a matter of seconds from control rooms or near the location of the vessels themselves. Inert gas is used to render hydrocarbon containing atmospheres explosion proof.

Personnel safety has also been the watchword in the advanced construction techniques. Any handle, rung or ladder on all of the many towers, chambers and vessels has been painted red in order to insure added visibility during day or night. The red ladders show up well under the extremely good nighttime lighting.

Aluminum — The plant represents an achievement in maximum utilization of aluminum. For example, two large horizontal steam tube dryers measuring 55 ft in length and 5 ft in diameter are unique in that they are the first all-welded aluminum dryers ever built. Aluminum piping, together with corrugated aluminum encasing all the insulation, contribute to a complete aluminum landscape.

A staff of 225 with an annual payroll of $1,500,000 man the ultramodern plant on a three-shift basis.

Florida Steel Expands Fabricating Facilities

Construction is underway on a new electric furnace and rolling mill for the **Florida Steel Corporation** at Tampa, Florida. It will have a capacity of 25,000 to 30,000 tons per year and will produce steel for the company's fabricating plants. Construction cost is around $1,250,000.

Operating divisions of the Florida Steel Corporation include: Bushnell Steel Products at Hialeah, Fla.; Bushnell Steel Works at Tampa; Carolina Culvert & Metal at Statesville, N. C.; Dominion Culvert & Metal Corp. at Roanoke, Va.; Florida Steel Products at Jacksonville, Orlando and Tampa; Tampa Forge & Iron at Tampa; and Tri-State Culvert & Mfg., at Tampa and Decatur, Georgia.

Firth Carpet — N. C.

A $2,500,000 expansion program

POWER PIPING FIRSTS

that have made Kellogg the pacemaker

As steam turbine operating pressures and temperatures have increased over the past 25 years, The M. W. Kellogg Company has continued to set the pace in power piping design, fabrication, and erection. Many of the developments which have brought the central power station to its present efficiency may be traced to the laboratory or shop techniques developed or first put to use in the industry by Kellogg.

Among Kellogg's many "firsts" of a general nature, listed in chronological order, are:

- *Forge and hammer welding of intermediate joints and branch connections in the United States*
- *Bare wire electrode welding in the shop*
- *Coated electrode welding in the shop*
- *Shop-corrugated super-flexible pipe*
- *Streamlined forged fittings*
- *Development of an integrated analytical solution for piping flexibility analysis to include multiple anchor and intermediate restraint problems*
- *Use of inversion procedures for piping flexibility analysis*
- *Development of model testing method for solving piping flexibility procedures*
- *Evaluation of stress range concept and fatigue basis for flexibility design*
- *Development of material specifications for C. ½% Mo. pipe having #3-#5 actual grain size to give optimum strength at high temperatures*
- *Kelcaloy bi-metallic transition or "K" pieces to join ferritic to austenitic piping*

Kellogg's "firsts" in the fabrication of power piping, listed at the right, are even more numerous. Kellogg welcomes the opportunity to discuss its complete facilities with consulting engineers, engineers of power generating companies, and manufacturers of boilers, turbines, and allied equipment.

FABRICATED PRODUCTS DIVISION

The M. W. Kellogg Company

711 THIRD AVENUE, NEW YORK 17, N. Y.

A SUBSIDIARY OF PULLMAN INCORPORATED

The Canadian Kellogg Co. Ltd., Toronto • Kellogg International Corp., London
Kellogg Pan American Corp., New York • Societe Kellogg, Paris • Companhia Kellogg Brasileira, Rio de Janeiro • Compania Kellogg de Venezuela, Caracas

FIRST IN FABRICATION OF:

- Piping from C. ½% Mo.
- Station piping for 900 F.
- Station piping for 950 F.
- Station piping for 2200 psi.
- C. ½% Mo. piping with #3-#5 actual grain size
- 1¼% Cr.-½% Mo. steam piping
- Steam piping for 1000 F.
- ½% Cr.-½% Mo. station piping
- 2% Cr.-½% Mo. station piping
- Station piping for 1000 F.
- 2¼% Cr.-1% Mo. station piping
- 1¼% Cr.-½% Mo. station piping
- 1% Cr.-1% Mo. V. turbine piping
- 2¼% Cr.-1% Mo. V. station piping
- Station piping for 1050 F.
- 3% Cr.-1% Mo. station piping
- Type 347 stainless turbine piping
- Mercury vapor piping for 1000 F.
- Station piping for 1003 F. for France
- Type 347 stainless station piping
- Station piping for 1100 F.
- Type 316 stainless station piping
- Type 316 stainless station piping for 3500 psi-1050 F., 325 MW.
- Type 316 stainless station piping for 5600 psi-1200 F., 325 MW.

POWER PIPING—THE VITAL LINK

is now underway at **Firth Carpet Co.'s** Burnsville, N. C. plant.

Full use will be made of the existing building which is now operating at 40% of capacity; weaving facilities will be added; and plant personnel will be increased from 200 to 500.

Completion is anticipated by the end of the year.

GAYLORD BOX PLANT AT DALLAS, TEXAS

Southwestern warehouse and manufacturing facilities of the **Gaylord Container Corporation** are being expanded. A new 180,000 sq ft plant being built in the Northeast section of **Dallas** will replace the present smaller plant near Dallas' Love Field. When in full production, the new plant will employ about 350, which is an increase of more than 150 over the current force.

Plant management will remain unchanged, with **Wynne Williams** as plant manager, **Lloyd Merwin, Jr.,** sales manager, and **John Meinhardt,** superintendent. Gaylord Container Corporation is a division of Crown Zellerbach Corporation.

$1 Million Repair Shop for Union Tank — La.

Union Tank Car Company's $1 million maintenance and car repair shop in **Baton Rouge, Louisiana** is scheduled for completion within the next few months. **R. A. Lehr** will be superintendent of the new shop and **J. O. Ramsey,** assistant superintendent. All types of service now performed at Union Tank's current shop, which has been in Baton Rouge since 1925, will be handled at the new location, and other new ones will be added.

Union Tank Car Company is a supplier of tank cars serving the petroleum industry. The Baton Rouge operation is one of the major maintenance and car repair shops and employs approximately 100.

Pillsbury Mills — Okla.

Current plant expansion program of the Enid, Oklahoma plant of **Pillsbury Mills, Inc.,** is nearing completion. In early '57 a $300,000 installation of new turbo milling equipment was completed. A six story addition was started in late '57, which houses 36 bins for the bulk storage of flour with total capacity of 43,000 cwt. Other improvements included modernized loading facilities for millfeed, additional pneumtic bulk flour handling equipment, a new truck loading dock and added electrical power installations.

$13 MILLION CEMENT PLANT WILL SERVE ARK-LA-TEX AREA

October, 1958 is the target date for cement production in **Arkansas Cement Corporation's** $13 million plant now under construction at **Foreman, Arkansas. Charles C. Winning** will be plant superintendent. About 125-150 will be employed when the plant reaches full production.

Arkansas Cement Corporation is a wholly-owned subsidiary of the Arkansas Louisiana Gas Company, Shreveport, La. J. C. Hamilton, president of the latter company is also president of the new Arkansas Cement Company. General offices will be in Little Rock.

A 21-mile, $470,000 gas pipeline is also being constructed to connect the plant to the ALG system.

Reynolds Metals' Reduction Plant Serves Ford Motor Foundry — Ala.

A substantial part of the production of the new **Listerhill, Alabama** aluminum reduction plant of **Reynolds Metals Company** will be used by an adjacent foundry, recently constructed by the Ford Motor Company.

First of three potlines was tapped in late January and two more potlines are scheduled to go into service in the spring and early summer. New Reynolds' plant is adjacent to the recently modernized Listerhill reduction plant with which Reynolds entered the primary aluminum producing field in 1941. This plant is operating at full capacity. Total annual rated capacity of the new and old plants is 190,000 tons.

Aluminum from the new plant not needed by the Ford Motor Co. foundry will be delivered in molten form to the adjoining Reynolds fabricating plant or cast into pig and ingot form.

R. B. Newman is plant manager of the new facility. Buildings housing the potlines are of two-story construction, designed to prevent accumulation of heat given off by the reduction cells, which operate at more than 1700 F. Fresh air enters through the lower level, is drawn through all working areas, then is discharged through a venting system atop the buildings.

In addition, a newly-designed hooding system traps the cells' discharge of heat and smoke, which is carried by fans through a washing and scrubbing system before discharge into the atmosphere.

Big Expansion for Houston's Dore Co.

John L. Dore Co. and its affiliated firms are to undergo a $250,000 expansion program at Houston, Texas which will boost production by 50% and will virtually double facilities. The project includes additions of 9,000 sq ft to the plant and 1,000 sq ft to the offices, bringing the total to 22,800 sq ft. The new facilities will be of steel and masonry construction and will be air conditioned.

The expansion will provide additional facilities and equipment for extruding and compression molding of "Teflon"; for the producers of Teflon-lined steel pipe and fittings, extruded and molded nylon and other thermo-plastics; and for the sales organization of the company.

(Continued on Page 16)

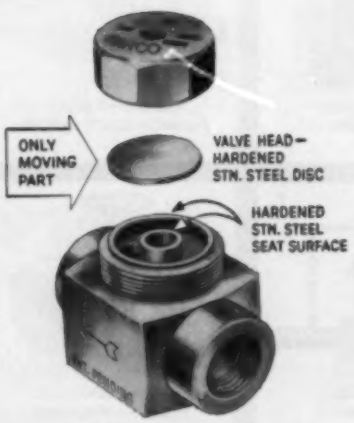
End these steam trapping problems!

1. High maintenance cost
2. Too many sizes and pressure ratings
3. Steam blowing on light load
4. Limited installation space
5. Pressure variations
6. Corrosion
7. Air binding
8. Freezing

ACTUAL SIZE

HERE'S HOW...

with the versatile Sarco TD Thermodynamic Steam Trap



ONLY 3 PARTS
SIMPLE—TROUBLE-FREE

All parts machined from stainless steel bar stock. Only moving part—a solid hardened stainless steel disc—practically wear-proof.

No mechanism—the kinetic energy of steam closes the valve. No narrow channels to choke. No gaskets to leak.

1. **Practically eliminates maintenance**—as shown, left, the TD has only 3 simple, rugged parts—all stainless steel. No mechanism . . . to wear or malfunction. Highly resistant to superheat, water-hammer, corrosive condensate.

2. **One trap for all pressures**—10 to 600 psi—for light or heavy loads. Self-adjusting—each size Sarco TD uses same large capacity seat for all pressures—without change or adjustment.

3. **Won't blow steam on light loads**—no prime to lose—no adjustments.

4. **Small as a tee fitting**—½" size, for example, only 2¼" long, 1¼" wide, 2⅛" high.

5. **Operates perfectly when pressure fluctuates**—absolutely no effect from 600 to 10 psi! No water seal to evaporate. No adjustments.

6. **Unaffected by corrosive condensate**—made of stainless steel throughout.

7. **No air-binding**—discharges at steam temperature and vents air and air-steam mixtures at start-up and during operation.

8. **Freeze-proof**—self-draining when installed with outlet down.

60-DAY TRIAL CONVINCES

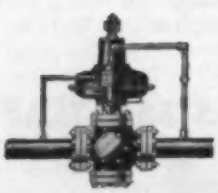
We will gladly send you a Sarco TD steam trap and strainer for 60-day trial. No cost or obligation. You buy *only* if completely satisfied. Advise size—⅜, ½, ¾ or 1"—and application. Sarco Company, Inc., 635 Madison Ave., New York 22, N.Y.

2217-B

SARCO Thermo-Dynamic TRADE MARK **STEAM TRAP**

THE MODERN STEAM TRAP—THAT CAN DO MORE THINGS BETTER!

WHAT...a "super market" in this business?



IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD... CHANCES ARE IT'S CONTROLLED BY...

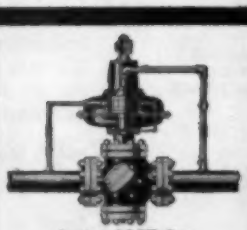
Type 657 with 3500 Positioner

Type 4150 and 4160 Wizard II Pressure Controllers

Type 95 Pressure Reducing Valve

Type 630 "Big Joe" Field Regulator

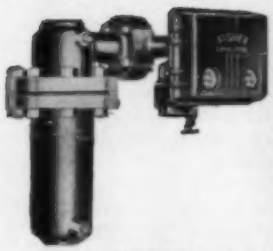
Series 99 Multi-Purpose Gas Regulator



Series 298T Gas Regulators

Type 655-A Pressure Regulator

YES! *now you can shop by phone, wire or TWX...* for shipment within 36 hours!

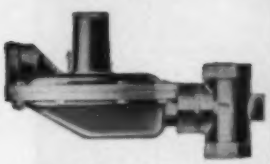


Series 2500-249 and 259B Level-Trols
Cage Sizes 14" and 32"

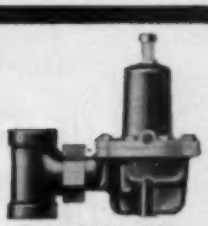
FACTORY STOCK ALWAYS ON HAND:

- Large stock of **DIAPHRAGM CONTROL VALVES**
- Wide choice of **LIQUID LEVEL CONTROLLERS**
- Assorted types of **MULTI-PURPOSE REGULATORS**

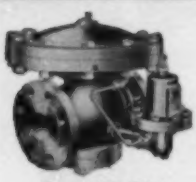
Type 75 Water Reducing Valve



Series S100 and 730 Service Regulators



Series 620 and 621 Farm Tap Regulators



Type 92B Pilot Operated Steam Reducing Valve

Series 67FR Combination Filter Regulator

Fisher's new special service department is organized much like a super market to help you meet emergency requirements with dispatch and speed.

A stock of the popular and standard diaphragm control valves, Wizard Controllers, level-trols and all types of gas regulators are kept on the shelf at all times ready to go.

Every Fisher representative receives a weekly list of all available types for the following week.

Now, when you're up against an emergency, phone, wire or TWX (Marshalltown 578 or 579) the factory or your Fisher representative ... your order will be enroute within 36 hours (except Saturday and Sunday) after it is received in Marshalltown.

FISHER® Controls

SINCE 1880

FISHER GOVERNOR COMPANY

Marshalltown, Iowa/Woodstock, Ontario/London, England

For more information, use Reply Card—Page 81

GEORGIA PLANT FOR ANACONDA

Anaconda Wire & Cable Company have started construction on their new $3 million, 150,000 sq ft plant at **Watkinsville, Georgia. David T. Werner,** Watkinsville plant manager and **Richard B. Steinmetz,** executive vice president of Anaconda spoke briefly at recent ground breaking ceremonies.

Reynolds Aluminum Supply Expanding in Louisville, Ky.

Reynolds Aluminum Supply Company, serving Southern industry through nine industrial metals warehouse facilities, is erecting a 70,000 sq ft warehouse and office building in **Louisville, Kentucky.**

The new building will warehouse an extensive line of aluminum mill products, steel flat sheets, copper sheets and flashing, industrial building products and stainless steel. Facilities will include power shears and slitters to cut metal to customer requirements.

Reynolds Aluminum Supply Company, with headquarters in Atlanta, Georgia, also operates warehouses in Savannah, Birmingham, Miami, Memphis, Nashville, Raleigh, and Richmond. The Company also has a sales office in Jacksonville and a Metal Container Division in Birmingham.

Mobile Expansion for American Cyanamid

American Cyanamid Company's Mobile, Alabama plant is being expanded to include facilities for the production of wax sizes, a line of chemical specialities for the paper industry. Expansion includes a two-story structure for new production and processing equipment, enlarged warehouse facilities and an expanded laboratory operation.

Monsanto Urea Plant at El Dorado, Ark.

Expected to be on stream by the early fall of 1958, Monsanto Chemical Company's new urea plant at **El Dorado** will have a capacity of 100 tons a day of urea in both prill and solution forms. Ammonia and carbon dioxide, both raw materials for the manufacture of urea, are made at the Inorganic division's El Dorado chemical plant.

Urea is an important ingredient in mixed ruminant feeds and in the production of urea formaldehyde resins.

Acoustical-Thermal Laboratory for Georgia Transformer Plant

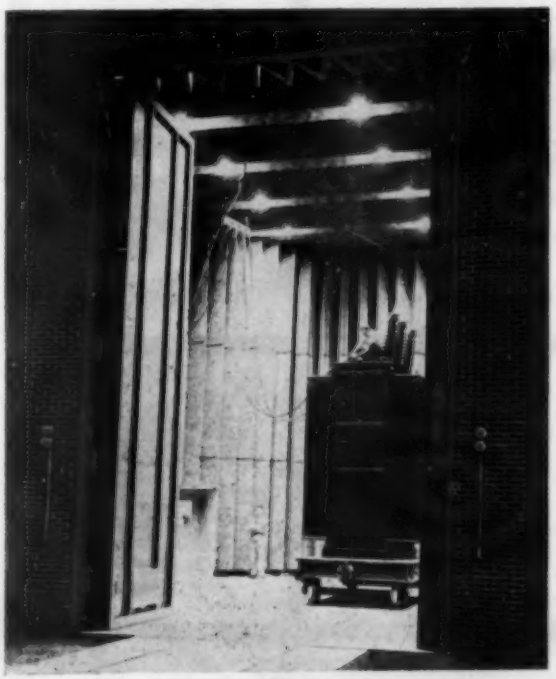
A new acoustical-thermal laboratory, designed to aid engineers in lowering sound levels and examining thermal characteristics of transformers, has been added to existing $25 million facilities at **General Electric's** Medium Transformer Department, **Rome, Ga.**

It is believed to be the first lab ever constructed to combine facilities for rapid, accurate experimental and production testing of both thermal and sound characteristics of medium transformers. It will be used to test both dry-type and liquid-filled transformers with ratings up to 10,000 kva.

For thermal tests, heat can be removed from the 2250 sq ft test chamber at the rate of 2000 Btu/min without a draft. Accurate testing of transformer sound characteristics down to 40 decibels is also possible.

The laboratory was designed to provide all necessary conditions for accurate sound testing — regulated power supply, low ambient sound, and a simulated free field. Heavy masonry construction excludes extraneous external noises to help insure low ambient sound, and serrated acoustical insulation in the form of glass fiber bats prevents internal sound reflection. Doors are pneumatically-sealed.

Exhaust fans and a duct system make possible the draftless removal of 2000 Btu/min to prevent gradual ambient temperature rise during thermal tests. A regulating autotransformer — composed of an induction regulator and an autotransformer — provides precisely-regulated power and insures good wave form and the wide range of volt/amp combinations needed for experimental testing.



Instrumentation for current, voltage, power, temperature, sound, vibration and harmonic analysis is housed in a 250-square-foot control room which adjoins the test chamber.

The answer is—in any situation where you need urgent help from an outside source.

Say, for instance, you have the responsibility of selecting pipe and tubing for industrial installations. You are planning to enlarge facilities in a paper mill. Your task is to choose a steel analysis that will do the work dependably, efficiently, and at the lowest cost. You know your job, you're confident, but still—it's a big responsibility.

That's when your telephone suddenly becomes your best friend. You pick it up and call National Tube. Our technically trained Mill Service Force, always available for consultation in the field regarding your tubing problems, quickly analyzes your specifications, and recommends the most suitable tubing for the job at the lowest cost to you. It's probably the same analysis that you chose, but at least you have peace of mind, knowing your judgment has been backed-up by 60 years of specialized tubing experience.

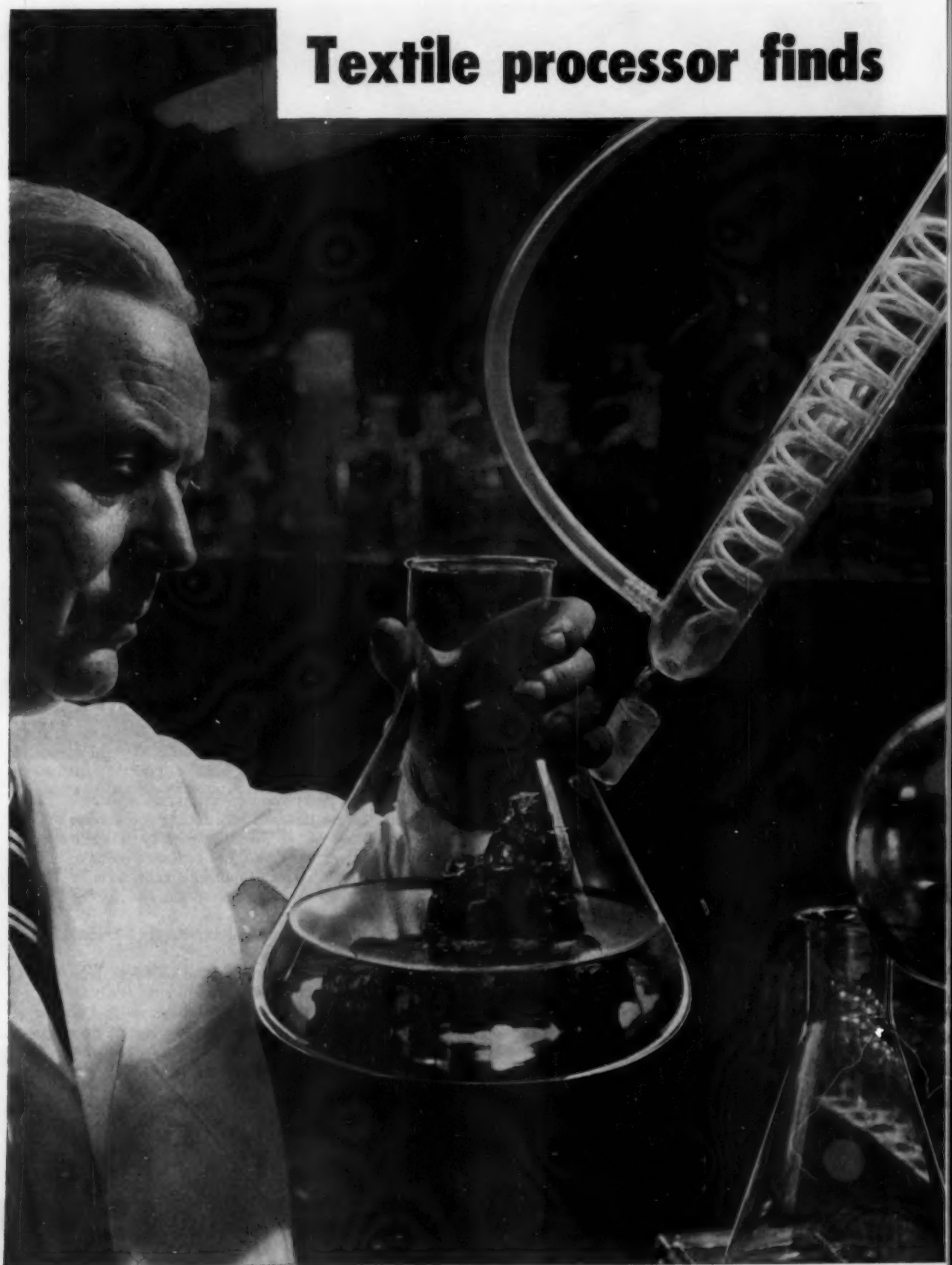
And what does this helping hand cost you? Nothing but a telephone call.

National Tube manufactures seamless pipe and tubes in a complete range of steel analyses from low carbon through the alloys up to and including stainless steels. A wide range of sizes and wall thicknesses is available for every mechanical and pressure purpose.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

National Tube Division of USS United States Steel

Textile processor finds



fuel cost solution in coal

Kerr Bleaching & Finishing Works' modern equipment cuts steam costs 33%, manpower 67%.

A reliable source of steam is a necessity in bleaching and finishing textile products. So when production demands at Kerr Bleaching & Finishing Works, Concord, N. C., called for additional steam capacity, the firm decided to build a new power plant. Coal was chosen as the fuel on the basis of cost studies.

A new boiler and modern coal handling system were installed. Automatic controls regulate the operation. The results were a 50% increase in steam capacity and a 67% reduction in manpower . . . with overall fuel and operating costs cut over 33%!

This modern unit was so successful—providing trouble-free operation and low-maintenance cost—that when even greater capacity was needed, an identical new unit was added. And, of course, no increase in operating crew was necessary!

Facts you should know about coal

Not only is bituminous coal the lowest-cost fuel in most industrial areas, but up-to-date coal burning equipment can give you 15% to 50% more steam per dollar. Today's automatic equipment pares labor costs and eliminates smoke problems. And vast coal reserves plus mechanized production methods mean a constantly plentiful supply of coal at stable prices.

Technical advisory service

To help you with industrial fuel problems the Bituminous Coal Institute offers a free technical advisory service. We welcome the opportunity to work with you, your consulting engineers and architects. If you are concerned with steam costs, write to the address below. Or send for our case histories, complete with data sheets. You'll find them informative.

Consult an engineering firm

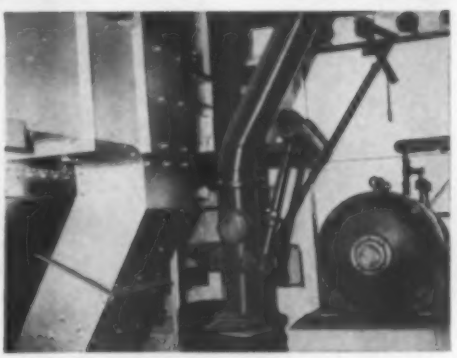
If you are remodeling or building new heating or power facilities, it will pay you to consult a qualified engineering firm. Such concerns—familiar with the latest in fuel costs and equipment—can effect great savings for you in efficiency and fuel economy over the years.

BITUMINOUS COAL INSTITUTE

Southern Building • Washington 5, D. C.

Firing aisle at the power plant of Kerr Bleaching & Finishing Works, showing two Babcock & Wilcox 60,000 lb/hr boilers—the more recent on the right. Fired by Detroit spreader-type Rotostoker, with steam-powered dump grates.

Control panels of Bailey Pneumatic Control System. Fuel feed, draft dampers, feedwater control—entire combustion operation is automatically regulated by this system.

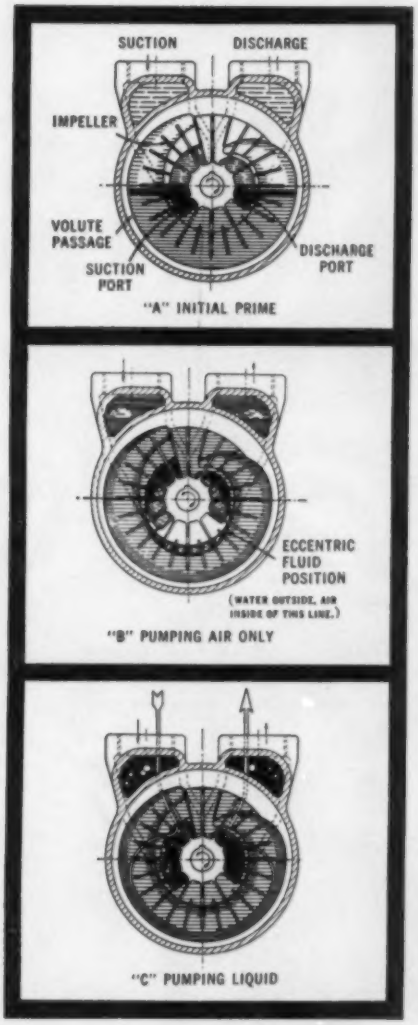


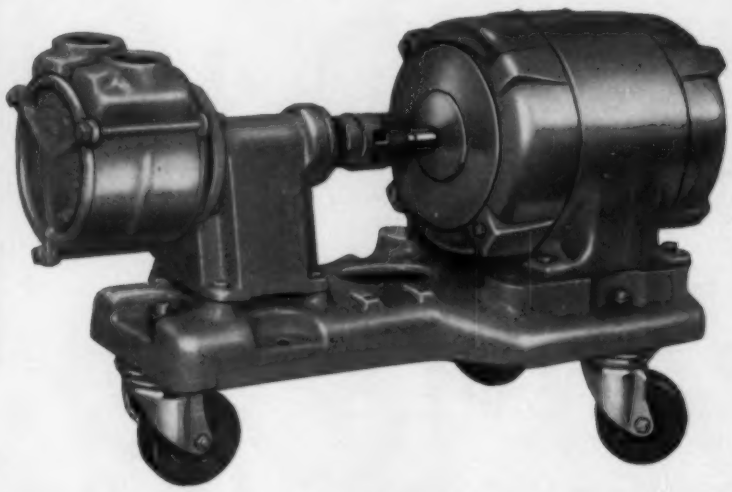
View in rear of Boiler No. 2. Pipe in center of photograph returns fly ash from collector to furnace to be burned again. Motor on the right drives induced draft fan.

Rear of Kerr's power plant showing the 250-ton coal storage silo. Coal is dumped into hopper by railroad car and carried by horizontal conveyor to bucket elevator at silo. Reserve coal pile is shown at left.

NOW there's a better pump for the toughest transfer service

Goulds new self-priming Liquid Ring Pump pumps liquid... pumps air... pumps liquid and air





Now you can get quick and continuous self-priming with a pump that handles any combination of air and liquid.

This unique new Goulds pump puts *centripetal* action to work to eliminate manual priming and air binding. Even with loops or leaks in your suction line its high air handling capacity keeps the liquid moving.

The pump's impeller and a volute casing achieve the self-priming. The impeller forces liquids along the volute, building up pressure as the liquid moves to the narrow end. This pressure sets up a liquid piston action between each set of blades, forcing liquids to the center of the pump. The liquid piston forces any air entrapped in the center up through the outlet.

The Goulds Fig. 2520 pump is available in all-iron construction, or in stainless steel for corrosive service. Offered as a mobile unit (as illustrated), pump-motor unit, or pump only for V-belt drive. With 1½ inch suction and discharge, the pump itself weighs 42 pounds. Capacities to 60 GPM, heads to 80 ft.

There's a complete description of the pump in Bulletin 725.6. Write for a copy or contact your Goulds representative.

GOULDS

PUMPS FOR INDUSTRY

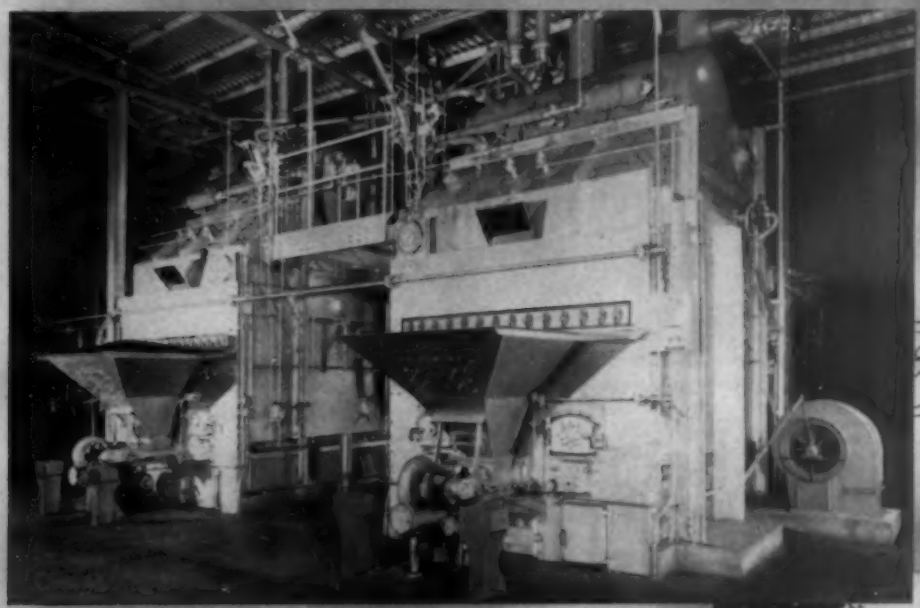
GOULDS PUMPS, INC.
Seneca Falls, N. Y., Main Office and Works

BRANCHES:
ATLANTA, 15 Peachtree Place, N.W.
BOSTON, Room 314, 1330 Beacon Street Brookline, Mass.
BUFFALO, 5475 Main Street
CHICAGO, 53 West Jackson Blvd.
HOUSTON, 2314 Main Street
NEW YORK CITY, Room 1503, 11 Park Place
PHILADELPHIA, 2099 North 63rd Street
PITTSBURGH, Room 512, Bessemer Bldg., 104—6th Street
TULSA, 543 East Apache Street, P. O. Box 6157

West Coast Representative: GOULDS PUMPS Western, Inc., 1919 N.W. Thurman St., Portland 9, Oregon
In Canada: The A. R. Williams Machinery Co., Ltd....in all principal cities

DETROIT STOKERS HELP REDUCE COST OF STEAM AT PINEHURST

The Detroit Stoker Equipped Steam Plant at this Famous North Carolina Resort Serves three Hotels, seven other buildings



Steam Plant, Pinehurst, Incorperated, showing Detroit Single Retort Stokers. Boilers are Babcock & Wilcox Integral Furnace Type FF.
John F. Taylor, *Manager Utilities* . . .
Wiley & Wilson, *Consulting Engineers*, Richmond, Va.

The Carolina Hotel, Pinehurst, N. C.—the largest of the three hotels served by this modern plant.

Cost of steam per thousand pounds has been reduced 33.4% by the new stoker — boiler installation, according to Mr. John F. Taylor, Utilities Manager, Pinehurst, Incorporated, Pinehurst, N. C. Amount of steam generated per pound of coal has been increased 22%.

The stokers are Detroit Single Retort Underfeed motor driven . . . the boilers are B&W Integral Furnace Type FF. A master regulator is connected to the Detroit Adjustable Feed Control on each stoker and to the adjustable damper of each motor-driven fan to regulate fuel and air in proportion to the load.

Detroit Underfeed Stokers provide high efficiency at low operating cost with small and medium size boilers.

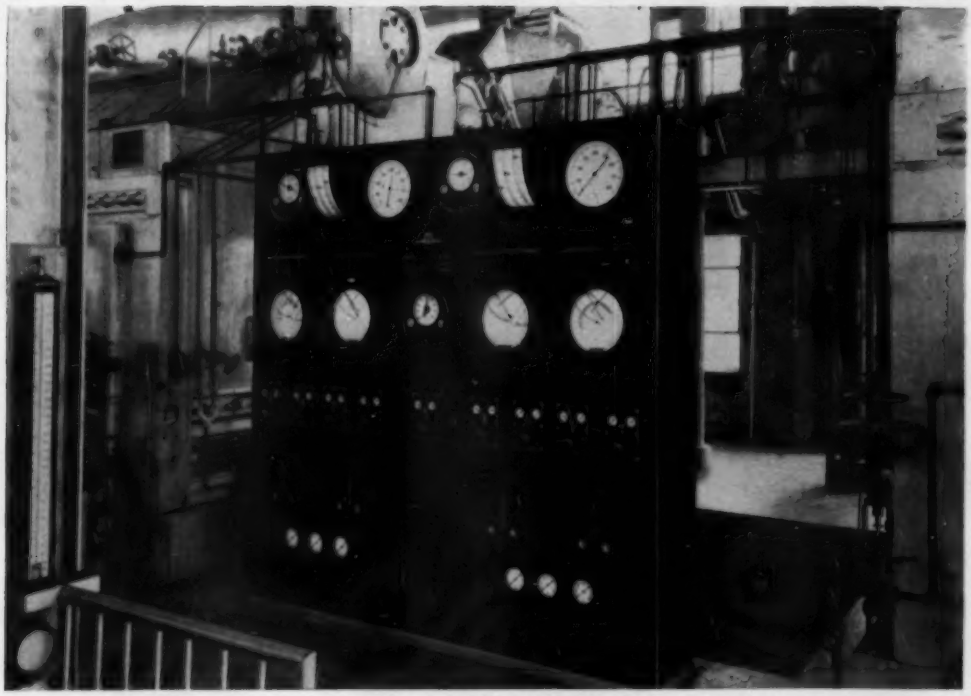
Write for Bulletins

DETROIT STOKER COMPANY

DETROIT SINCE 1898 STOKERS

MAIN OFFICE AND WORKS: MONROE, MICHIGAN

DISTRICT OFFICES OR REPRESENTATIVES IN PRINCIPAL CITIES



Bailey Meters and Controls for two boilers in a midwestern milling company.

How Bailey helps you get a new boiler off to a fast, safe start——

--The thrill of putting a new boiler "on-the-line" can be marred if you lack adequate metering and control equipment. You are a lot surer of a fast, safe start and dependable operation for a long time when you specify Bailey Meters and Controls. They are keys to peak efficiency and low operating costs.

Bailey is the choice of virtually all the most efficient plants on the Federal Power Commission's heat rate report. Here's why:

1. A Complete Line of Equipment

You can be sure a Bailey Engineer will offer the right combination of equipment to fit your needs. Bailey manufactures a complete line of standard, compatible pneumatic and electric metering and control equipment that has proved itself. Thousands of successful installations involving problems in measurement, combustion, and automatic control are your assurance of the best possible system.

2. Experience

Bailey Engineers have been making steam plants work more efficiently for more than forty years. Veteran engineer and young engineer alike, the men who represent Bailey, are storehouses of knowledge on measurement and control. They are up-to-the-minute on the latest developments that can be applied to your problem.

3. Sales and Service Convenient to You

There's a Bailey District Office or Resident Engineer close to you. Check your phone book for expert engineering counsel on your steam plant control problems.

A131-1

BAILEY METERS

Instruments and controls for power and process

BAILEY METER COMPANY

1028 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

LET'S TALK STEAM...

Below is a Vibra-Grate Stoker at work! . . . helping produce steam at lowest possible cost per pound. Look how evenly fuel is distributed in the bed — no holes, no light spots to cut down combustion efficiency!

Vibra-Grate feeds and moves wet or dry fuel automatically by intermittent vibrating motion. It is water-cooled to give you longer grate life and minimum maintenance.

You will also find that the AE Vibra-Grate Stoker gives you freedom from smoke at both high and low ratings . . . eliminates need for dust collectors and cinder return systems . . . will burn low-grade coals efficiently . . . continuously and automatically discharges ash . . . can burn gas or oil singly, or in combination with coal.

Vibra-Grate is built for efficiency. It is many years ahead of all others in design and performance. If you are modernizing or considering a new power plant, it will pay you to find out more about Vibra-Grate. Just write to American Engineering Company.

OTHER OUTSTANDING AE-DESIGNED STOKERS

Perfect Spread Stoker: gives maximum combustion efficiency at lowest cost per pound of steam, REGARDLESS OF QUANTITY OF FUEL USED! Feeders have spiral-type rotors for lateral and longitudinal coal distribution.

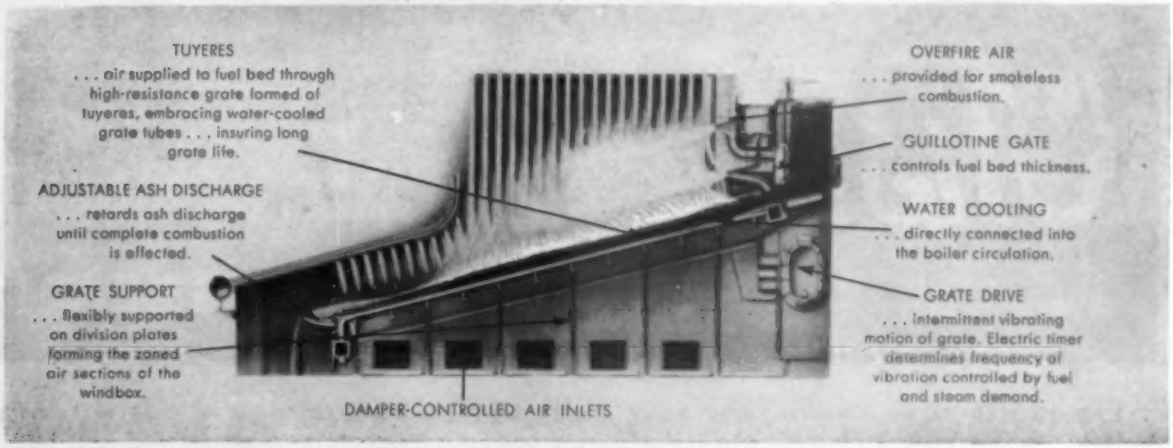
Taylor Stoker, Type "H": low-cost steam for moderate-sized plants. The same underfeed principle of combustion in high-capacity stokers for large central stations and industrial plants.

Taylor Stoker, Type "R": for power requirements ranging from 20,000 to 500,000 pounds of steam per hour. A completely self-contained unit . . . quick-firing . . . with adequate reserve capacity.

AMERICAN ENGINEERING COMPANY
Wheatsheaf Lane & Sepviva Street, Philadelphia 37, Penna.

Canadian Subsidiaries: Affiliated Engineering Corporations, Ltd., Montreal, P. Q. Bawden Industries Ltd., Toronto, Ont.

(5-103)


TUYERES
. . . air supplied to fuel bed through high-resistance grate formed of tuyeres, embracing water-cooled grate tubes . . . insuring long grate life.
ADJUSTABLE ASH DISCHARGE
. . . retards ash discharge until complete combustion is affected.
GRATE SUPPORT
. . . flexibly supported on division plates forming the zoned air sections of the windbox.
DAMPER-CONTROLLED AIR INLETS
OVERFIRE AIR
. . . provided for smokeless combustion.
GUILLOTINE GATE
. . . controls fuel bed thickness.
WATER COOLING
. . . directly connected into the boiler circulation.
GRATE DRIVE
. . . intermittent vibrating motion of grate. Electric timer determines frequency of vibration controlled by fuel and steam demand.

Never a doubt about "GOING UP"

Otis

ENGINEERED SERVICE
BY THE MAKER"

freight elevator

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N. Y.

2,000 ft. with 144,000 lbs. of starch

A. E. STALEY, JR.
President

A. E. STALEY MFG. CO.
Decatur, Illinois

Otis Maintenance keeps this "Single Trip" capacity of 20 Otis Freight Elevators constantly at work

"We do a tremendous starch processing job here at Decatur," says A. E. STALEY, Jr. "Our yearly output is valued at many millions of dollars. We're constantly moving tons and tons of material through more than 100 buildings. To do this we have 20 OTIS Freight Elevators that can lift as many as 1,440 of our 100 lb. starch bags to a combined height of 2,000 feet—all at once!

"Our concern is the uninterrupted operation of our 20 freight elevators. This is where we depend upon OTIS to give us the big lift OTIS is famed for. Our standardization on OTIS Elevators permits OTIS to assume full responsibility. It also simplifies overall maintenance. A tightly coordinated plan has been engineered to replace all wearing parts before their breakdown point. All operating and safety features are continually tested and adjusted.

"When it is realized that our 20 OTIS Freight Elevators have given an aggregate of 560 years' service and are still running like new, we feel that it isn't necessary to comment further on the quality—*or the fair cost*—of OTIS Maintenance."

ONLY OTIS MAINTENANCE OFFERS THESE ☑ ADVANTAGES TO OWNERS OF OTIS FREIGHT ELEVATORS

- ☑ **"Engineered Service" by the maker maintains the original efficiency of the installation and assures peak performance at all times.**
- ☑ **Services of factory-and-field trained men with a knowledge of elevatoring that can't be matched.**
- ☑ **Availability of original or improved replacement parts for every installation, regardless of its age.**
- ☑ **Freedom from unexpected, expensive repair bills. There's just one fixed monthly charge. It can be budgeted. It's adjusted annually, up or down, on labor and material costs only. Never because of the age or condition of the equipment.**
- ☑ **Guarantee of the maker's high standards of safety through the constant checking and replacing of parts in advance of their breakdown point.**
- ☑ **Elimination of all guesswork in testing and repairing by using specially designed tools and electronic equipment to minimize shutdowns.**
- ☑ **Systematic upkeep and replacement of parts extend the life of an installation indefinitely.**
- ☑ **The value of a maker's pride. A perfectly performing Otis installation is Otis' best salesman. That's why we're never satisfied with anything less than peak performance at all times.**

maintenance that keeps freight elevators running like new

OFFICES IN 297 CITIES ACROSS THE UNITED STATES AND CANADA

Maple St., Small Town, U.S.A.

A TOWN WHERE "NOTHING EVER HAPPENS"...

A home town—like your town. A place where people said "it couldn't happen to us."

But it *did*. Like a whip, a great tornado lashed down Maple Street, splintering houses, leaving people hurt—homeless—panic-stricken.

A desperate call went out for the Red Cross and quickly, automatically, the team went into action.

Red Cross nurses slipped into uniform . . . volunteers set up first aid stations . . . canteens fed the hungry. Later, Red Cross money and work helped rebuild the town.

Last year was one of the worst disaster years of this century, and the year before, 1956, was almost as bad. Every month and in every state, the Red Cross strained to the limit as hurricanes, floods, tornadoes, forest fires swept across the country.

Red Cross receives no government funds—depends entirely upon *you* for support. Give as much as you can. Your dollars may go to your own town when it needs them most.

Join and Serve

SPACE CONTRIBUTED BY SOUTHERN POWER & INDUSTRY

Architect-Engineer
George L. Dahl Architects and Engineers
Dallas, Texas

General Contractor
R. P. Farnsworth & Co., Inc.
New Orleans, La.

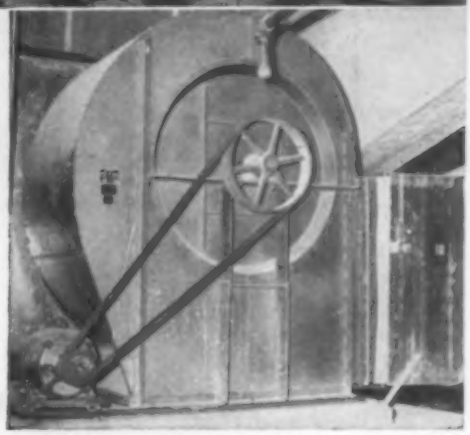
Plumbing, Heating, Air Conditioning
C. Wallace Plumbing Co., Inc.
Dallas, Texas

Another Coliseum Chooses Clarage Air Handling and Conditioning Equipment

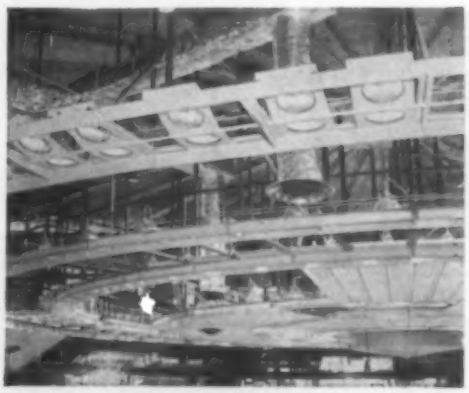
IMPRESSIVE in the Texas tradition is the new Dallas Memorial Auditorium. Its circular arena building, reportedly the largest cement domed structure in the nation, connects with a convention building and lyceum, shown on the right above.

Air handling throughout this vastness was assigned to Clarage equipment — Multitherm conditioning units, Unicoil sprayed coil units, giant system fans, ventilating sets.

Here again, as in New York's new Coliseum and other prominent buildings of all types, Clarage equipment was chosen for its recognized ability to perform quietly, economically, and dependably. CLARAGE FAN COMPANY, Kalamazoo, Mich.



One of several Clarage Type NH fans located in the outer ring which encircles the Coliseum's dome.



Arrangement of air conditioning ductwork, viewed before completion of the ceiling.

CLARAGE ... *dependable equipment for making air your servant*

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

HOW THESE INSTALLATIONS

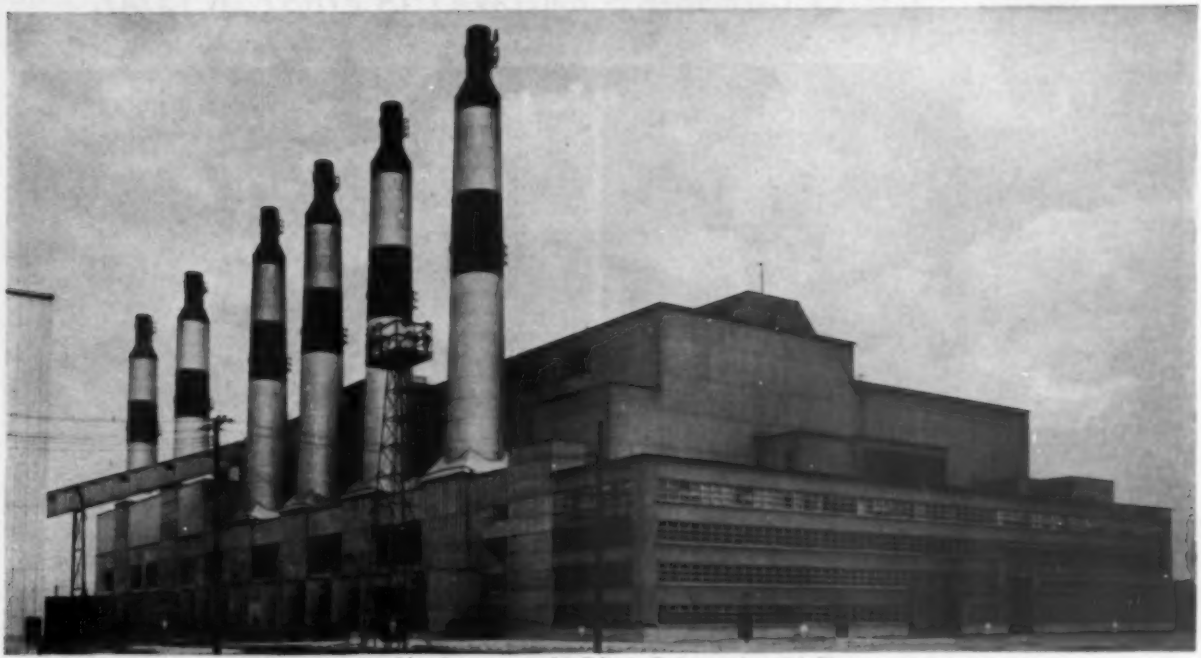
Jersey Central Power & Light Company's E. H. Werner Station. Here the success of the B&W Cyclone Furnace Boiler, the first installed in the East, has led to the purchase of two more boilers.

The B & W Cyclone Furnace...

A Modern, Economical Way to Burn Fuel for Power

Niles Station of Ohio Edison Company where two B&W Cyclone Furnace Boilers have been in operation since 1954.

UTILIZE LOW-GRADE FUELS



The first Cyclone Furnace Boiler was ordered by Commonwealth Edison Company in 1944. Since then this utility has purchased 15 more units, six of them for the Ridgeland Station shown here.

The B&W Cyclone Furnace simplifies the entire process of coal preparation, combustion, ash handling and ash segregation. Its cost-saving quality contributes to lower fuel costs and reduced maintenance as well as increased operational simplicity, flexibility and safety.

Although the B&W Cyclone Furnace operates simply and dependably on either oil or gas, it is particularly effective in utilizing inexpensive, low-grade coals. Its rapid combustion burns the coal more completely and operates with low excess air. Most of the ash is melted to slag right in the Cyclone Furnace, where it is easy to handle and dispose of. The slag cleaning and fly-ash problems so prevalent with other types of firing are consequently alleviated.

Many other modern advances in combustion and high-pressure, high-temperature steam generation are available through B&W. Write for further information today. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

G-882

BABCOCK & WILCOX

BOILER DIVISION

PURCHASERS OF THE B&W CYCLONE FURNACE

	Number of Cyclone Furnace Boilers
FOR CENTRAL POWER STATIONS	
Atlantic City Electric Co.	1
Baltimore Gas & Electric Co.	1
Chilena de Electricidad	2
Columbus & Southern Ohio Electric Co.	2
Commonwealth Edison Co.	16
Consumers Public Power District (Nebraska)	1
Detroit Edison Co.	1
Indiana & Michigan Electric Co.	1
Jersey Central Power & Light Co.	3
Memphis Light, Gas & Water Division	3
Middle South Utilities, Inc.	1
Missouri Public Service Co.	1
Monongahela Power Co.	1
Northern Indiana Public Service Co.	3
Ohio Edison Co.	2
Ohio Power Co.	6
Public Service Co., of New Hampshire	1
Tampa Electric Co.	3
United Illuminating Co.	2
Wisconsin Power & Light Co.	4
FOR INDUSTRIAL INSTALLATIONS	
American Cyanamid Co.	1
American Enka Corp.	1
Columbia Southern Chemical Co.	1
Consolidated Water Power & Paper Co.	1
Dow Chemical Co.	5
Eastman Kodak Co.	1
Greenwood Mills	1
International Paper Co.	4
National Container Corp., of Wisconsin	1
Rhinelander Paper Co.	1
St. Croix Paper Co.	1
Thilmany Pulp & Paper Co.	1
West Virginia Pulp & Paper Co.	1
Total	**75**

WHY CHESSIE'S RAILWAY IS FIRST IN COAL

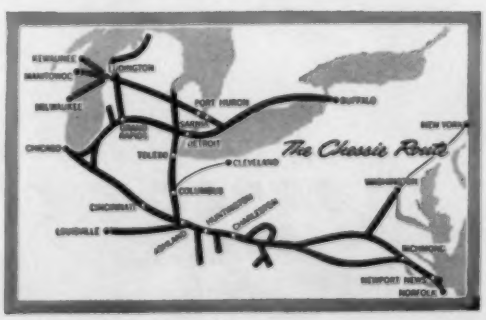
SUPERIOR COAL. The naturally high quality coals produced on the C&O are processed to meet your specifications by modern methods and equipment. Here small sizes are being dewatered by a battery of vertical screens which do the job with a minimum of degradation.

SUPERIOR SERVICE. Chesapeake and Ohio not only owns the world's largest fleet of coal cars—it keeps 99% of them operating by its prompt repair program. New automatic yards, new signal systems and ample power keep the cars rolling to insure on-time delivery.

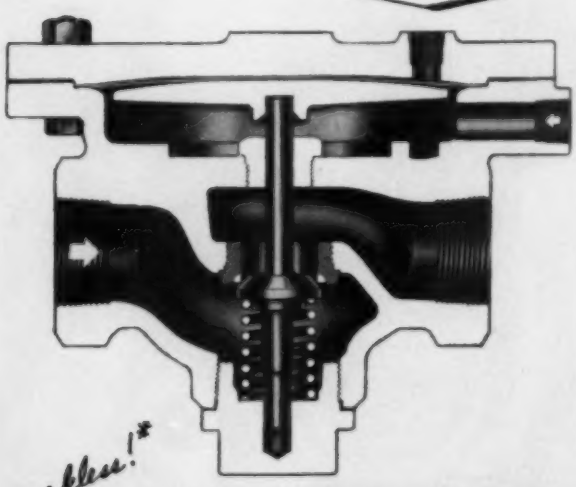
For dependable deliveries of top quality coals, contact coal producers on the C&O. And for specific help in meeting your own fuel requirements, write to: R. C. Riedinger, General Coal Traffic Manager, Chesapeake and Ohio Railway Co., Terminal Tower, Cleveland 1, Ohio.

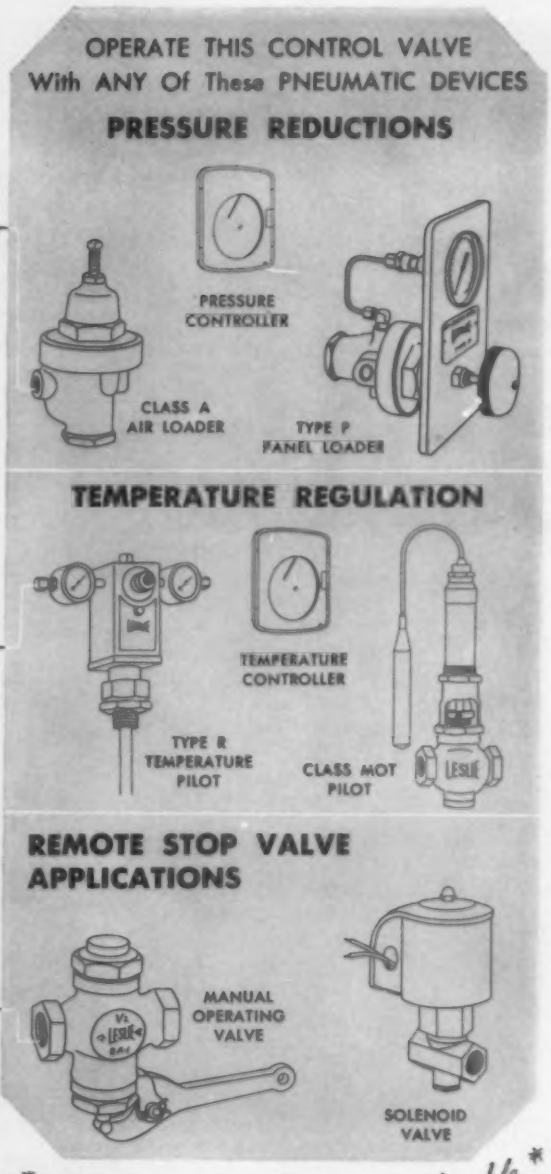
Chesapeake and Ohio Railway

WORLD'S LARGEST CARRIER OF BITUMINOUS COAL



A NEW LESLIE FINAL CONTROL ELEMENT





A REALLY VERSATILE CONTROL VALVE — with only two moving parts

Now, simplified instrumentation combines the simple air loaded, Leslie diaphragm operated valve with various air operated devices. This is the valve that filled a real need when introduced about a year ago, wearing a 3-year guarantee against maintenance in normal pressure reducing services.

This new final control element is gaining wide acceptance for use with a variety of pneumatically operated controllers — simplifying pressure reductions, temperature regulation, remote stop valve applications and many process steam control services.

Ideal for "problem" installations

This control valve is ideal for either continuous or intermittent service and has remarkable immunity to dirty steam. Furnished in cast iron, sizes ½ - 2", it is suitable for any steam service up to 250 psi, 450F, and many fluid services.

It's simple — it's accurate

This Leslie control valve has only two moving parts ... no fussy seals, no stuffing boxes, no small dirt-catching parts; yet, with all its simplicity, it provides uncanny accuracy with its feed-back action. It lends itself readily to remote adjustment, too.

More Information

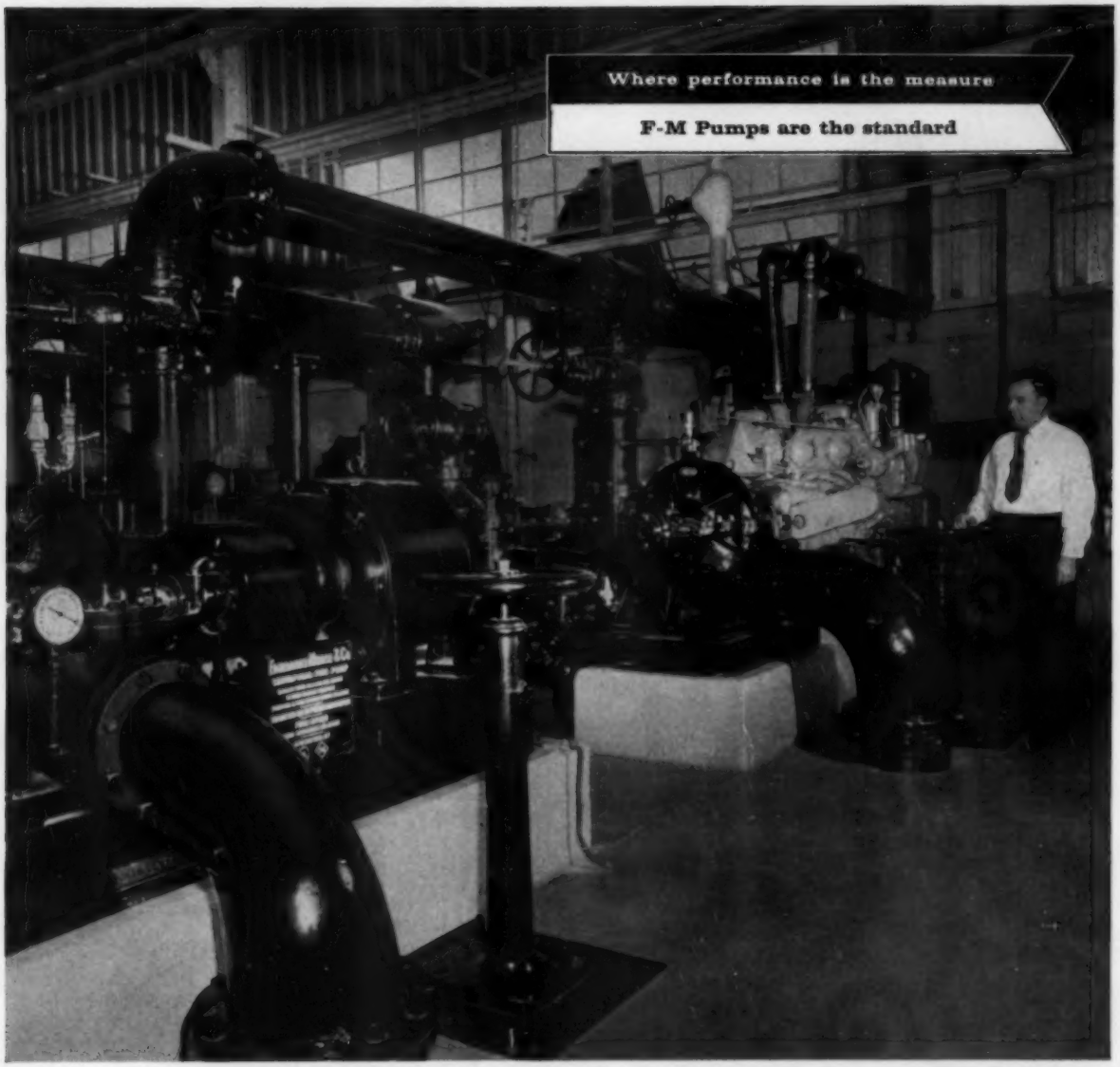
Ask your Leslie engineer to tell you more about this really versatile valve and the simplified instrumentation "packages" now available. You'll find him listed in your classified directory under "Valves" or "Regulators" and eager to come up with new ideas for simplifying pressure, temperature and liquid level control systems.

Send for Bulletin 561-A

* These are the President's comments — even the ad manager didn't know all the fine features!

REGULATORS and CONTROLLERS

261 Grant Avenue, Lyndhurst, New Jersey



Mr. George Biggar, plant engineer of Ford Motor Company assembly plant at Mahwah, N. J., checks Fairbanks-Morse fire pumps (1500 gpm. motor-driven pump in foreground, 2500 gpm. diesel-driven pump near Mr. Biggar).

Ford guards against fire at giant new plant

To protect one of the world's largest auto assembly plants against fire, Ford Motor Company depends on these two Fairbanks-Morse fire pumps. As the heart of an extensive system, the two F-M pumps provide defense in depth, one pump backstopping the other.

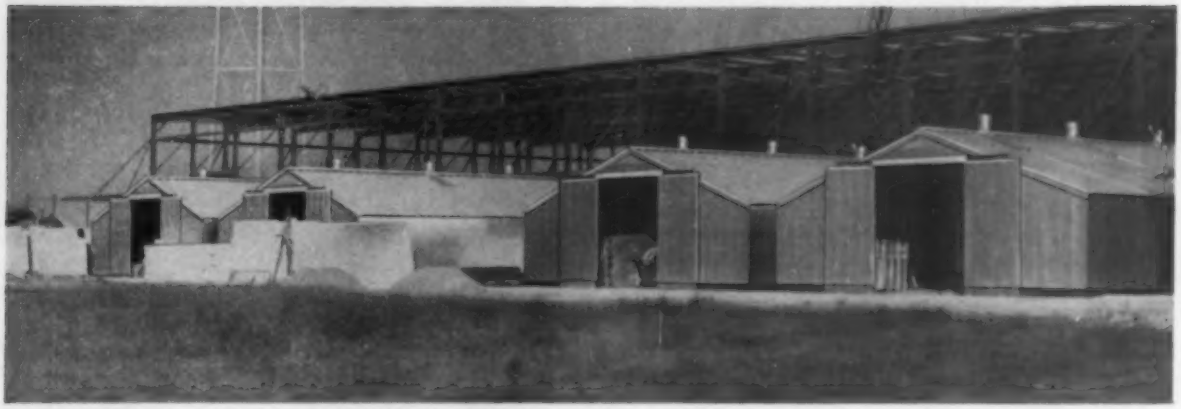
This installation is typical of the great care and planning by modern industry to prevent the catastrophe of fire. Call in your F-M Sales Engineer for expert assistance in pump specification. As builder of the world's greatest variety of hydraulic combinations, Fairbanks-Morse will provide the exact type, exact size pump you need for maximum dependability.

For information write Fairbanks, Morse & Co., Dept. SPI 3-10, 600 S. Michigan Ave., Chicago 5, Ill.
Ask for F-M Fire Pump Bulletins 5814F (horizontal) and 6920F (vertical).

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS

How a Contractor and a Manufacturer Saved Money with an Armco Steel Building



Four Armco Steel Utility Buildings, in foreground, provide shelter for textile machinery while the new Carlisle Finishing Company plant is being completed. Later, they were dismantled and moved to other cities for re-erection on permanent sites.

Consulting Engineer:
J. E. Sirrine Company,
Greenville, South Carolina

When Carlisle Finishing Company, Carlisle, South Carolina, drew up plans for a new plant, the company and the building contractor made a novel agreement that saved money for both of them!

The contractor, Daniel Construction Company, Inc., of Greenville, South Carolina, put up an economical 70- x 140-foot Armco Steel Building for their use during construction of the main plant. After construction work was completed, the Armco Building was turned over to Carlisle, a division of Cone Mills Corporation, textile manufacturers of Greensboro, North Carolina. Now it's a permanent warehouse.

On the same project, company officials had the problem of storing textile machinery arriving before the plant was completed. As a solution, they erected four Armco Utility Buildings, each 36 by 48 feet, adjacent to the site for this purpose. After the new plant was completed, two of the buildings were dismantled, moved about 150 miles to Greensboro, North Carolina, and re-erected at the owner's White Oak Plant. The other two buildings were also dismantled and sent to the Greenville, South Carolina, plant to be used for storage.

In each case, an Armco Building provided shelter at the construction site and was later used as a permanent structure for another purpose.

* * *

Armco Buildings, with their all-bolted construction that simplifies erection or re-erection, are one of the more than 30 Armco Drainage and Construction Products for industrial, municipal, highway and railway applications. Write for data.

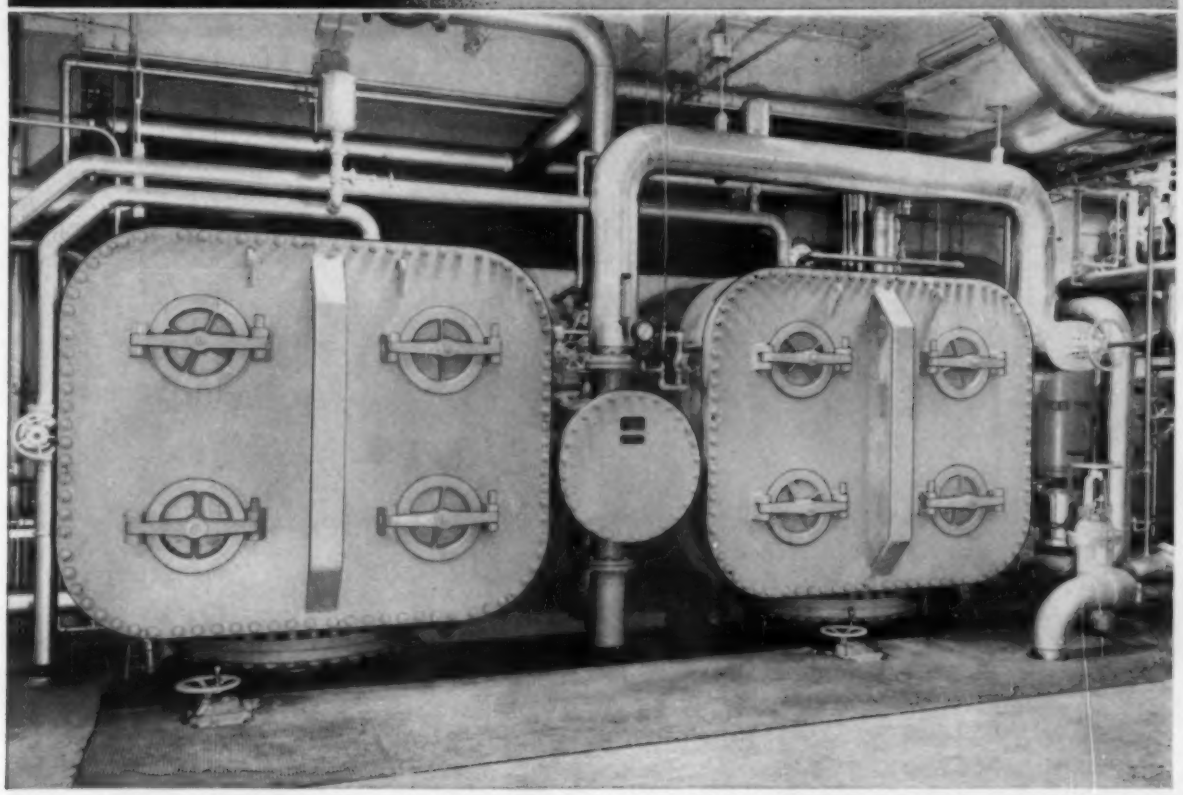
ARMCO DRAINAGE & METAL PRODUCTS, INC.
DIXIE DIVISION
619 Forsyth Bldg. • Atlanta, Georgia
SOUTHWESTERN DIVISION
C & I Life Bldg. • Houston, Texas
Other Offices in Principal Cities

This Armco Steel Building was purchased by the Carlisle Finishing Company to serve as shop, office and equipment storage for the contractor. According to plan, it was later used as a warehouse by the owner.

These Armco Utility Buildings are shown here after being dismantled, moved 150 miles, and re-erected at another of the owner's plants.

Armco Construction Products

PROGRESS IN POWER through PROGRESS IN HEAT TRANSFER EQUIPMENT



NEW-DESIGN CONDENSERS SAVE SPACE AND MONEY

Steam generation of electricity has made tremendous progress in the last 25 years because of the ever-increasing efficiency of the equipment used.

A power equipment manufacturer with many "firsts" to its credit, Yuba is continually designing, among other equipment, condensers with low head room to save much-needed space. This advancement is illustrated above in the photograph of a rectangular shape condenser for the Suwanee River Plant of the Florida Power Corp.

A low pressure heater is installed between the tube banks to further save plant space, as well as initial cost for foundation and piping. An additional design feature of Yuba condensers is a de-aerating section within the condenser shell which eliminates the main plant de-aerating heater. Maintenance and downtime costs are reduced by welding tubes into tube sheets.

For advanced condenser design, that will save space and money, consult the Yuba Heat Transfer Division, formerly the Heat Exchanger Division of The Lummus Co.

YUBA HEAT TRANSFER DIVISION

HONESDALE, PENNSYLVANIA
NEW YORK SALES OFFICE: 530 FIFTH AVENUE
REPRESENTATIVES IN PRINCIPAL CITIES

Other Yuba Divisions
Adsco Division, Buffalo, N. Y.
California Steel Products Division, Richmond, Calif.
Yuba Manufacturing Division, Benicia, Calif.

YUBA

STEAM SURFACE CONDENSERS
EVAPORATORS
STEAM JET REFRIGERATION
STEAM JET AIR EJECTORS
FEEDWATER HEATERS
BAROMETRIC CONDENSERS

YUBA CONSOLIDATED INDUSTRIES, INC.

MANAGEMENT CLINIC

RETIREMENT — 62? . . . 65? . . . 66? . . . ?

Conducted by ROBERT H. EMERICK, North Charleston, S. C.

Question . . . . . .

OUR COMPANY employs about 100 non-skilled and semi-skilled workers as laborers, sand-blasters and foundry helpers. Most of them have been with us from 15 to over 40 years, and recently there has developed a controversy over their retirement.

Our company's normal retirement age is 66, but recently we have lowered this to 62 for men whose work is predominently physical. The reason for the change is that two of these elderly workers have died on the job in the last six months, and from our investigation of these deaths we concluded that a lower retirement age is essential not only to prolong their lives, but to insure the company's getting a full day's work.

The company union is protesting this ruling which they feel is discriminatory, and there is even a possibility of their calling a strike. Meanwhile we are convinced that our stand is just and proper. What do you think?

Suggestion . . . . . .

THERE can be no quarrel with the idea of retiring an employee who is unable physically to discharge his normal duties; however, it seems better from the standpoint of industrial relations to evaluate physical conditions individually, rather than as a group. The grouping probably is what the union objects to, and it is quite possible to retire a man under this ruling who is entirely able to continue with his job, and has no infirmities whatever.

There is economic justification for *not* retiring a man who is able to carry out his duties, since transferring him to the retired payroll is in effect, transferring him from production to overhead. Additionally, the expense of hiring and training his replacement, setting up new pay accounts and records, may total anywhere between $250 and $1,000.

The Clinic suggests that you make the new ruling more flexible, in order to compensate for individual differences of physical condition. Wording somewhat like the following seems appropriate:

"Retirement at age 62 for all employees engaged in work that requires heavy physical exertion is mandatory, *unless* a special physical examination at that time establishes the ability of the individual concerned to continue in the full and satisfactory performance of his duties. Satisfactory performance shall mean satisfactory in the opinion of his immediate supervisor or department head as distinguished from the medical report."

For individuals who are kept active beyond their 62nd birthdays, a re-certification should be made every 12 months.

This plan is used by many companies, others set a mandatory retirement age with the proviso that any individual may be continued active past this age when such a continuance is in the best interests of the company. The point is, don't give up a competent employee earlier than you must.

Glazing operation requires both water and compressed air. 4,000 ft of SPANG Pipe comprise water lines, 1,000 ft carry compressed air.

Dewey W. Hall, Hall Plumbing & Heating Co., inspects the compressed air system at Stylon Southern Corporation. 5,000 ft of Spang Steel Pipe, in sizes from ¾" to 12", were installed at Stylon Plant No. 2.

Dependable past performance creates second SPANG® Steel Pipe order at Stylon Southern Corporation

The new $2,000,000 Plant No. 2 of Stylon Southern Corporation at Florence, Alabama contains 5,000 ft of SPANG Steel Pipe to carry water and compressed air for the manufacturing of ceramic tile.

"With the new plant's capacity calling for the production of eight million square feet of ceramic tile a year, we must have reliable air and water piping to produce at this rate and operate efficiently," reports Mr. Robert C. Jackson, Plant Engineer.

"Based on our experience with a similar SPANG Pipe installation at our Plant No. 1 in 1954, we chose SPANG again for its dependability. The new installation, put into use in July, 1956, has performed perfectly."

Produced in a complete range of styles, sizes and colors, Stylon Ceramic Tile is used for walls, floors and counters in home and commercial applications. Combined, Plants No. 1 and No. 2 produce 15 million square feet of ceramic tile yearly. And SPANG Pipe plays a vital part in maintaining this production.

QUALITY CONTROL PROVIDES DEPENDABILITY

SPANG Steel Pipe is *quality-controlled* from skelp to finished product. Each lot is tested and inspected to bring you *top-quality* pipe that is easy to cut, bend and weld. There's a SPANG Distributor near you. Let him serve you on your next piping job.

Architect: Turner & Northington, Florence, Ala.
General Contractor: Brice Construction Company, Birmingham, Ala.
Piping Contractor: Hall Plumbing & Heating Company, Florence, Ala.
Spang Distributor: Tallman Supply Company, Florence, Ala.
Mechanical Engineer: Robert C. Jackson.

SPANG-CHALFANT SPANG®
DIVISION OF THE NATIONAL SUPPLY COMPANY CW STEEL PIPE

General Sales Offices:
Two Gateway Center, Pittsburgh, Pa.

District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis

INDUSTRY SPEAKS

Power Distribution Troubles

Adapted from comments at the Tenth Annual POWER DISTRIBUTION CONFERENCE, sponsored by the Electrical Engineering Department of the University of Texas.

UNDERGROUND TROUBLES — R. M. Howe, chief utilities engineer for **Magnolia Petroleum Company's** refining division at Beaumont, Texas, said that underground installations had been a source of trouble even though such installations were restricted to service entrances, motor leads, etc.

"In past years," he said, "these underground installations have been made with lead covered cables using pot heads for terminations. Failures of lead covered cables were not uncommon, due to moisture either in the cable or the pot head. Generally this would be caused by electrolytic attack on the lead sheath or the expansion and contraction of the compound used in the pot heads.

"Because of these troubles, and for other reasons, we have now standardized on synthetic insulated cables for underground work. Also we do not use shielded cables except on our 13.8 kv system. This has led to the elimination of pot heads for terminations and also the elimination of their troubles. In the type of terminator used, the insulated conductor extends through this terminator and it doesn't make much difference if the water does get inside the terminator. So far, after about two years of using this type of terminator we have had no reported failures."

Another source of distribution system trouble mentioned by Mr. Howe was that of insulator leakage in contaminated areas.

"On overhead lines in the vicinity of cooling towers," he reported, "and in one case adjacent to a boiler blowdown stack, leakage of insulators has caused pin failures and damage to cross arms. We have tried special design insulators and higher voltage rated insulators with moderate success, but we feel that this hasn't been an adequate answer.

This problem has been approached on recent installations by the use of aerial cables, taking care to install lightning arrestors at the point of change from open wire to cable. To date we feel this is the answer to our problem, although it is sometimes the more expensive answer."

M. L. Watts, assistant general foreman of electric department for **Humble Oil and Refining Co.,** told the conference that his company's experience indicated principal causes of distribution troubles to be failure of hardware in corrosive atmospheres, failure of bolted type connectors in corrosive atmospheres, crowded and overlooked circuits, and hazards of open wire construction around operating units.

Refering to the troubles resulting from circuit crowding, Mr. Watts explained that congestion in some areas had reached the point where something had to be done to reduce the number of open wire lines.

Aerial cable favored — "The possibility of going underground was considered," he said, "but it was found that in most areas there were so many obstacles it would be necessary to go 10 to 12 feet deep to find a place to run these circuits. In places where it is possible to run underground it is necessary to encase all conduits in red concrete to protect against digging machines. In a number of cases circuits are installed underground for short distances to get into a unit or substation where it is best not to have open wire construction or cable. However, aerial cable has in most instances proved to be a satisfactory and economical solution to this problem.

"The first aerial cables installed were used for 13.8 kv power house getaways. These cables were single-conductor, each on a separate messenger, and they were all comparatively short. Later some three-conductor 13.8 kv feeder cables were run to a distribution substation. These cables were continuous from 13.8 kv switchgear to 13.8 kv/2400 volt transformer primary. The next step was aerial cable for the 2400 volt distribution system."

FEATURE OF DESIGN is suspended ceiling with space above which serves as plenum chamber for air conditioning and provides space for electrical circuits and sprinkler piping. Note

Engineers Describe Plant Layout and Plant Services

Sperry Rand Comes to Florida

By NEWTON C. EBAUGH and PAUL B. BERGMAN

Ebaugh & Goethe,
Consulting Engineers
Gainesville, Florida

Building Services Superintendent
Sperry Electronic Tube Division
Gainesville, Florida

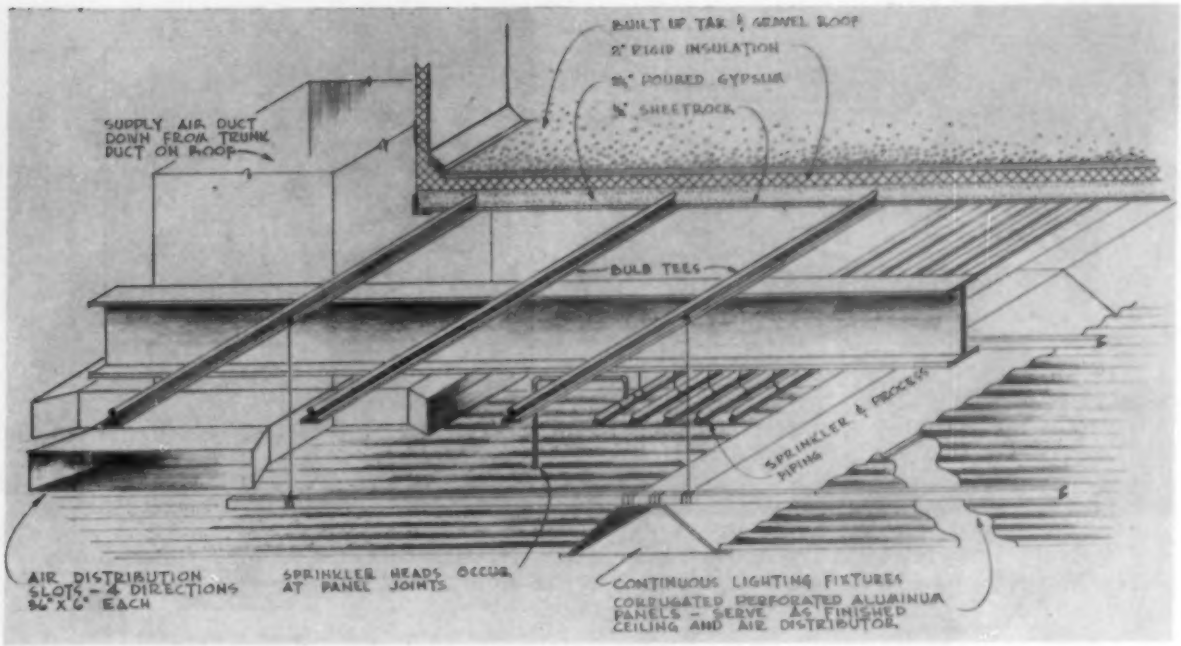
TO EXPAND its manufacturing and development facilities for specialized microwave electronic tubes, the Sperry Rand Corporation in Spring of 1954 selected Gainesville, Florida for the site of its new Sperry Electronic Tube Division. Today this 101,000 sq ft facility under the direction of J. C. Brenner, Vice-President and Works Manager, is the largest producer of high-power klystrons for super radars of the armed forces.

The City of Gainesville made available a 48 acre site adjacent to the Municipal Airport. This site was the Alachua Air Base during World War II. Since practically all utilities had been removed from the site, the City of Gainesville agreed to provide a new 12,000 volt power line from their municipal power system, a 150,000 gallon elevated water tank with supply well and treatment, and the sewage disposal plant.

The plant building was constructed by the Employees Fidelity Fund, Inc., an organization financed by the City of Gainesville Employee's Pension Fund. The property is leased to Sperry Rand on a long time basis with the privilege to purchase any time after six years occupancy.

The plant was designed in accordance with Sperry's requirements for the manufacture of klystron tubes. These are microwave frequency vacuum tubes used for radar, military air navigation systems, and telephone and telegraph relay transmitting towers which are springing up across the country.

The accompanying outline drawing shows departments of the plant and flow of materials. The first unit was occupied in 1955 and has


BUILT UP TAR & GRAVEL ROOF
2" RIGID INSULATION
2½" POURED GYPSUM
½" SHEETROCK
SUPPLY AIR DUCT DOWN FROM TRUNK DUCT ON ROOF
BULB TEES
SPRINKLER & PROCESS PIPING
AIR DISTRIBUTION SLOTS - 4 DIRECTIONS 96" X 6" EACH
SPRINKLER HEADS OCCUR AT PANEL JOINTS
CONTINUOUS LIGHTING FIXTURES
CORRUGATED PERFORATED ALUMINUM PANELS - SERVE AS FINISHED CEILING AND AIR DISTRIBUTOR

lighting arrangement over controlled atmosphere furnaces in the photograph. Drawing shows construction details of space between roof and ceiling. Corrugated panels are removable.

65,000 sq ft of usable area. An addition occupied late in 1957 doubles production capacity of the plant. This additional 36,000 sq ft makes a total of 101,000 sq ft. The building has a steel frame with masonry walls and concrete floor. The roof is poured gypsum on gypsum form boards. It is insulated with 2" of fiberglas and covered with a 20 year bonded tar and gravel roof.

The front section of the building houses administrative and managerial offices. The next two bays behind the office section house the cafeteria, factory lockers and toilets, factory engineering, material inspection, receiving and shipping departments. The building roof steps up at this point to maintain approximately a 13 ft headroom below the suspended ceiling for the manufacturing areas.

The photograph shows typical vacuum tubes which are manufactured. Some of these contain parts so small and precise that they require assembly under microscopes. The product requirements are so exacting that it is necessary to maintain "hospital clean" conditions in the plant. Employees in the assembly area wear nylon clothing to avoid lint and all air is thoroughly conditioned to maintain hospital cleanliness and 50% humidity.

Air Conditioning

Air conditioning of the office and cafeteria areas is provided from a 40 ton packaged water chiller with unit air conditioners below the window of each office. Chilled water is circulated in summer and hot water from a steam convertor is circulated in winter.

All factory areas are air conditioned from pent houses on the roof. These units are supplied with chilled water from two 150 ton Trane Centravac water chillers. The pent house units were built on the job and include American Air Filter Company automatic paper filters followed by electrostatic precipitators, and washed coils for accurate temperature and humidity control.

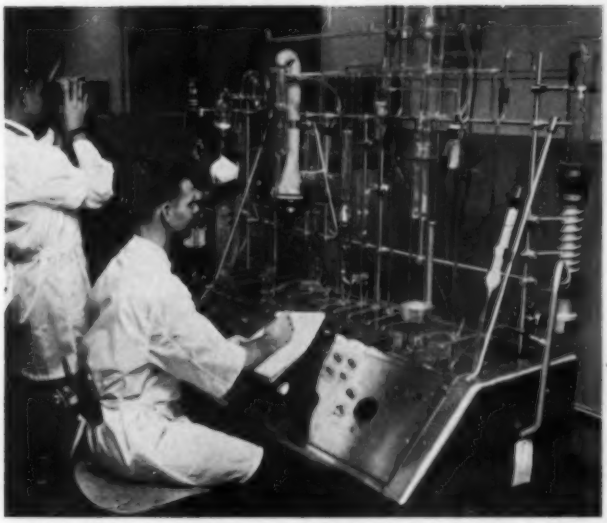
Steam is provided for heating, and for reheat when needed for humidity control. Controls are Johnson Service Company pneumatic.

Due to the large volume of air required for ventilation of the Plating Room, this area is designed with a pent house air supply unit similar to the air conditioning units except that the cooling coils are omitted. The Plating Room is exhausted through tank hoods to ducts under the floor with exhaust stacks and fans outside. It is designed to maintain a slightly negative pressure in this area so that some conditioned air flows through the door openings from the assembly area.

Steam for plating tanks and heating and air conditioning is provided by two 100 hp packaged boiler units burning No. 2 fuel oil. Continuous supervision is not required for any of the heating and air conditioning systems as these are all fully automatic.

Air Distribution

A unique and economical system for air distribution and lighting is used in the factory area. Air from the pent house units is distributed with insulated ducts over the roof to the center of approximately every two bays of the building. Distribution boxes mounted below the roof project



Apparatus for measuring gas content of metals purchased for tube parts.

Mass spectrograph for rapid materials analysis in control laboratory.

the air above the ceiling to each of the bays.

The details of this system are shown in one of the drawings. The space between the suspended ceiling and the roof is a plenum. The ceiling is Reynolds Metals perforated prepainted aluminum panels which are supported by the light fixtures.

Two years of operation have proven this design to be completely draftless, and quite flexible in meeting the loads. If equipment on the assembly floor is moved, it is possible to follow the load by adjusting the projection nozzles in the distribution boxes.

The ceiling panels can be easily removed and washed to maintain the hospital cleanliness required. Due to the extreme cleanness of the supply air, very little maintenance has been required for the ceiling panels.

All process gas, water and air piping, sprinkler piping, and electrical conduit are above the ceiling and out of the assembly area. These remain clean and still they are fully accessible through the removable ceiling panels.

Electrical System

Power is purchased at 12,000 volts from the City of Gainesville municipal system and stepped down to 480 volts with a 2,000 kw transformer bank. Power is distributed to the manufacturing areas at 480 volts through a combination of bus ducts and trolley ducts mounted above the ceiling. This affords complete flexibility of equipment location on the assembly floor. In general, the bus duct is used above the electric furnace areas and trolley duct over the smaller load areas.

Lighting throughout the plant is provided with glass enclosed suspended fluorescent units designed for 50 footcandle illumination at the working level.

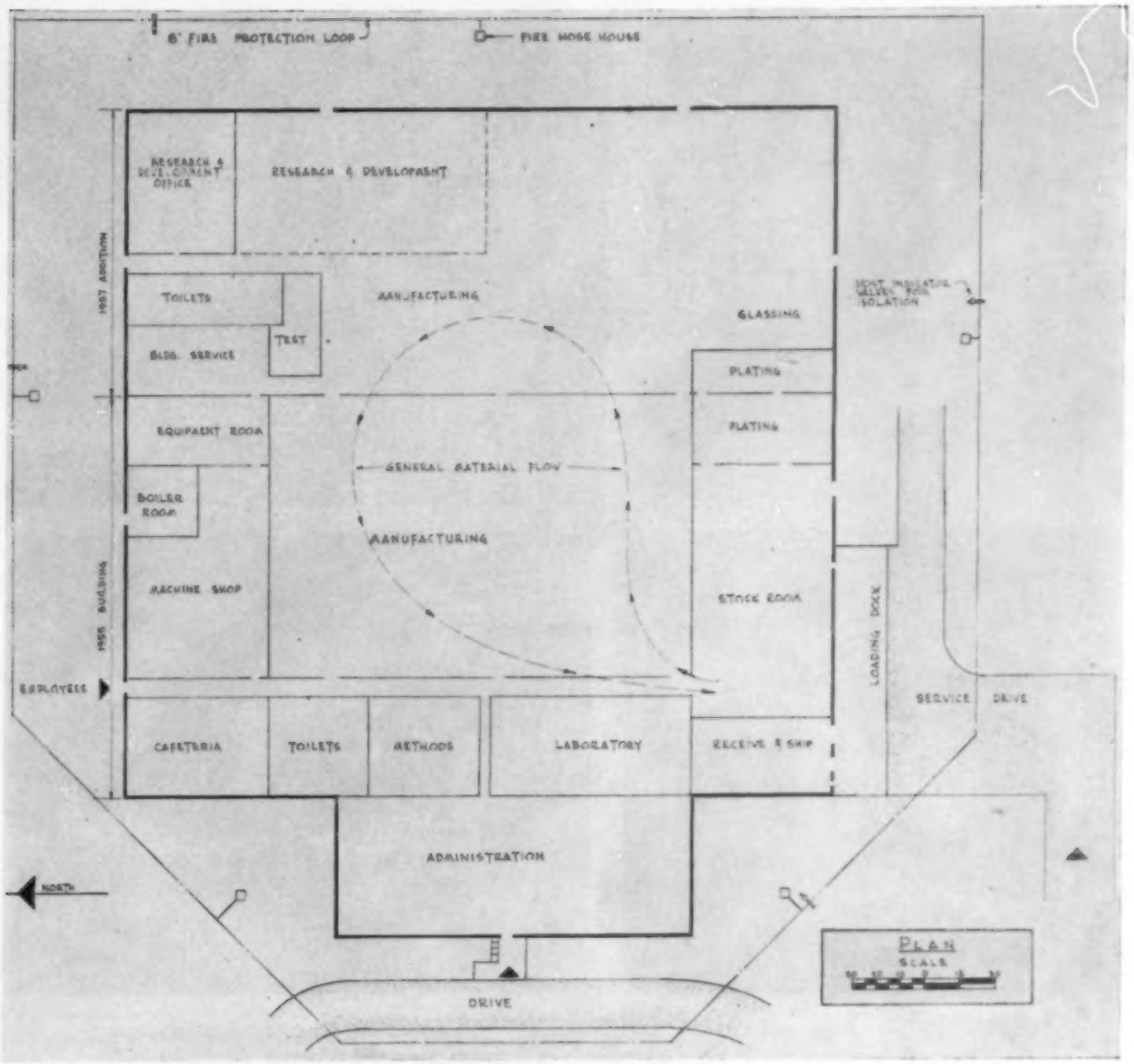
Flanges on the suspended light fixtures support the ceiling panels. These fixtures use power at 277 volts in order to keep the electrical system cost to a minimum. The glass covers are required as part of the hospital cleanliness feature necessitated by the nature of the manufacturing operations.

Emergency power and lighting

SERVICE EQUIPMENT

Sperry Rand Plant — Gainesville, Fla.

Fans and Coils	Trane Co.
Water Chillers	Trane Co.
Filters & Precipitators	American Air Filter Co.
Boilers	Cyclotherm
Controls	Johnson Service Co.
Transformers	General Electric, Westinghouse, and Central Transformer Co.
Lighting Fixtures	Daybrite and Westinghouse
Engine-Generators	D. W. Onan & Sons and Fairbanks, Morse & Co.
Pumps	Allis-Chalmers
Sprinkler System	Henley & Beckwith Inc., and Wm. H. LaDew Co.
Elevated Tank	Chicago Bridge & Iron Co.
Fire Extinguishers	Buffalo
Demineralizers	Pfaudler Permutit, Inc.
Valves	Crane Co.



Outline of plant showing various departments and general flow of materials.

is provided by an automatic L P Gas engine driven generator. This unit provides sufficient emergency illumination for safety requirements and keeps vital services in operation such as gas dissociators and vacuum pumps.

Some lighting and miscellaneous small power loads are supplied from 480/208/120 volt 3 phase air cooled transformers placed near suitable distribution panels.

Water Supply

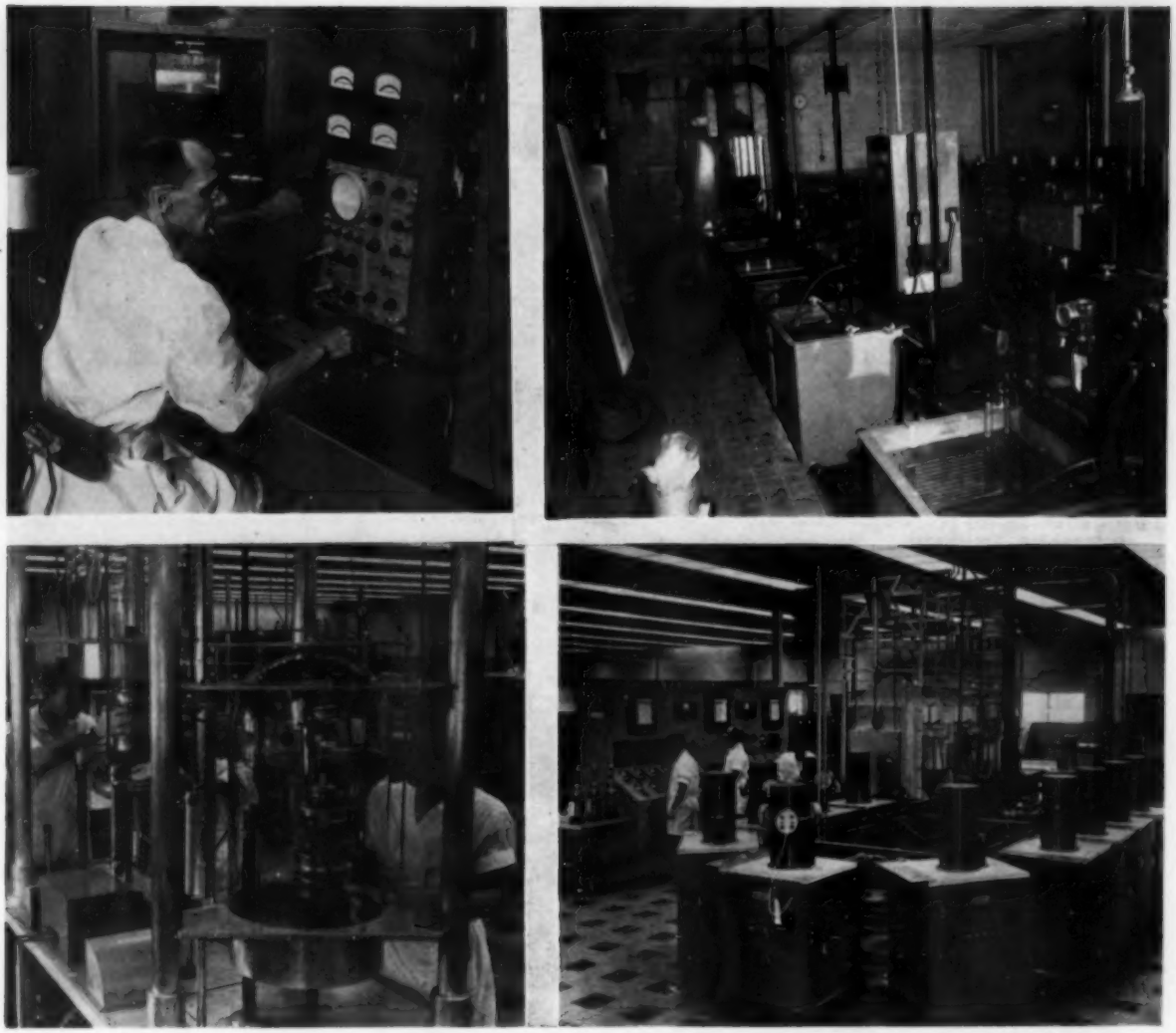
Penisular Florida is a buried limestone mountain which acts as a huge sponge for ground water. The elevation of the factory site is 152 feet above sea level, and in this area of Florida water stands approximately 60 feet above sea level in the limestone. Practically unlimited quantities of water can be developed by deep wells drilled into the limestone aquefier.

All water requirements are supplied by deep wells. The water has a small hydrogen sulfide content which is removed by chlorination which also sterilizes the potable supply. The only other treatment needed is to raise the pH with soda ash to prevent corrosion.

Water for plating solutions and rinse tanks is demineralized and recirculated.

Waste Disposal

There is no stream in the area which would permit discharge of nickel, copper, silver and cyanide ions from the plating operations. These are collected in the demineralizers which are then backwashed with acid and alkali for regeneration. The regenerate solutions are held in tanks and properly neutralized and rendered to harmless salts through oxidation with chlorine. The neutralized salt solutions are pumped to sand fil-



UPPER LEFT — Tube test console. UPPER RIGHT — Ventilating air enters plating department through perforations in ceiling and leaves through down-draft hoods. LOWER LEFT — Brazing in hydrogen under bell jar. LOWER RIGHT — Tubes being evacuated under automatic exhausters.

ter drying beds.

Domestic wastes are handled with conventional primary settling followed by sand filters. This produces a very acceptable effluent which is discharged to a drainage ditch.

Fire Protection

Fire insurance is carried with the Factory Insurance Association and their requirements are fully met in the design of the plant fire protection systems.

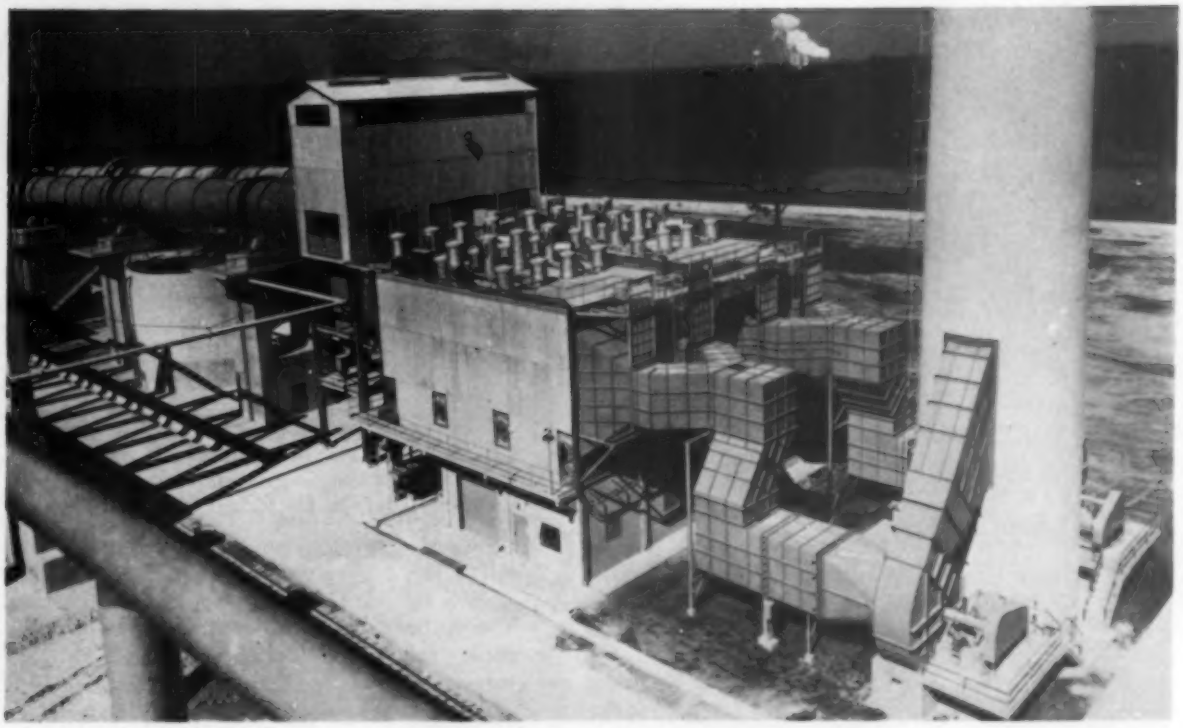
An 8-in. fire loop suitably sectionalized with valves surrounds the plant and supplies a complete system of sprinklers and first aid fire hose reels inside. Fire hydrants and completely equipped fire hose houses are located outside of the building.

The 150,000 gallon elevated storage tank is provided with double risers. The lower 100,000 gallons is reserved for the fire protection system. In addition, a secondary supply of 3000 gpm is provided by a deep well turbine pump, electrically driven and automatically controlled to start on a reduction of pressure on the fire protection system. The fire well may also be used to produce potable water in the event of a breakdown of the potable water well pump.

Various chemical fire extinguishers are provided throughout the plant for first aid fire fighting.

Design

The plant was designed by Ebaugh & Goethe, Consulting Engineers of Gainesville, and Pierson & Dirkes, Associated Architects of Gainesville. Paul Bergman of Sperry Rand's staff supervised the internal layout of the plant and coordinated the work with Sperry's requirements, based on experience at their Great Neck, New York, Plant.



CLEAN CEMENT PLANT . . . . . Lake Charles, La.

SPIC-AND-SPAN cleanliness in cement manufacture is accomplished at the Lone Star Cement Company's new plant near Lake Charles, La., which went into production a few months ago. Key equipment is the electrostatic precipitator (center of upper photograph) which cleans the kiln gases before they reach the stack at right.

The installation consists actually of four precipitator units, each with two functioning fields through which the gases must pass, and connected by ducts so that two units serve each of the two kilns.

Induced draft to draw the gases from the kilns through the precipitator is provided by fans, one of which can be seen at the base of the stack at lower right.

Controls for the battery of four electrostatic precipitators are housed in the dustfree room shown in the lower photograph. In the background are the four vacuum-tube power units. The workman is standing at one of the four control consoles. To his right, appearing as an extension of the console, is the automatic power regulator for that unit.

Looking to the future and to a possible desire by Lone Star to increase production, the installation has been designed so that a third precipitating field may be installed in space already provided at the stack end of each chamber.

The precipitators and controls were designed and built in Baltimore, Md., by the Metal Products Division of Koppers Company, Inc.

Power Distribution to Atlantic Steel's Rod Mill

Cable and Supports

By C. A. McGUINESS
Electrical Superintendent
Allegheny Industrial Electrical Company, Inc.

The author points out how short ends of cable trough and ladder were used to support power and control cables in vaults under the floor of the rolling room.

ATLANTIC STEEL Company's new Merchant Bar and Rod Mill incorporates some of the latest developments in electrical power distribution.

Like many primary metals manufacturers, Atlantic Steel uses much power. It is important that distribution of the power, both in control and power circuits, be efficient and dependable. It is also important that the cables be supported easily and inexpensively. Accordingly, cable ladder was adopted to support the interlocked power cable circuits and cable trough to support the flexible control cable circuits.

Both systems save a substantial amount of material over conduit and require far less time to install.

Cable and Supports

Interlocked armor cable was specified for the power circuits. The advantages of this type of cable are well known — higher current air ratings than are allowed for exposed conduit, and lower costs — but the advantages of cable ladder to support interlocked armor cable are not as widely appreciated.

Cable ladder, as the name implies, is made up of longitudinal pieces held together by lateral lengths or rungs. The cable is supported by the rungs and secured to them by cable bands. The bands keep the cables in orderly array and are strong enough to secure the cables firmly in the event of failure. Because the interlocked armor cable is self-supporting, only intermittent supports are required. Drop outs to panels are simple and no fittings are required, the cables merely are dropped out of the ladder between the rungs.

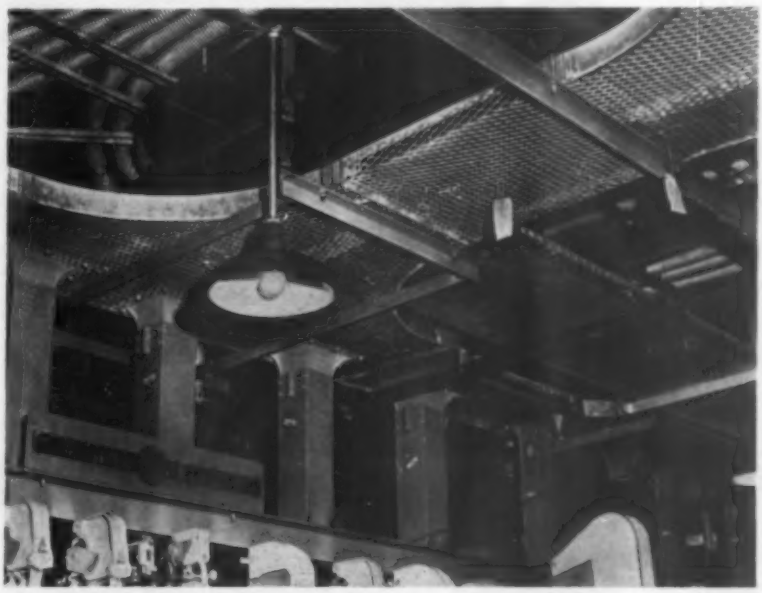
The ladder is available in various lengths and widths and a number of standard fittings permit turns, elevation changes, and branch runs with a minimum of field cutting. Where field cutting is required adapters permit the cut end to be connected to the next section.

Control cables, being flexible, are not self-supporting and, consequently, need continuous support. This is adequately supplied by cable trough manufactured from expanded metal that allows the air to circulate freely through and around the cables. If flexible cable were supported only intermittently, cable insulation would tend to "creep" where cables cross the rungs. Eventually, there would be a failure. However, cable trough is nearly as flexible as cable ladder and is just as simple to install.

The electrical equipment was furnished by the General Electric Company, who also supplied the electrical installation design. These included the specifications for the cable supports that were furnished by T. J. Cope, Inc. The General Electric Company has stated that the support of cables in ladder and trough, in addition to offering substantial labor savings, material savings, and higher current ratings, also permits a greater flexi-

Interlocked armor cable drops between the rungs of ladder and is picked up again by the ladder to carry the cable down the wall of the motor room.

The General Electric interlocked armor cable is shown mounted on the ceilings and the Flamenol control cable is shown in the Cope trough mounted on the side wall of the tunnel running between the motor room and the area across the mill.



The maize of trough and ladder above the d-c control panels. Special square ducts were fabricated to carry control cable from the trough into top of d-c panels.

bility during installation and greatly simplifies the problems of future expansion or changes.

The cable trough and ladder largely eliminated confusion during construction, even in such normally crowded areas as the motor room, where so much control is located in a comparatively small area. In all 13,000 ft of interlocked armor cable in ladder and 35,000 ft of multi-conductor control cable in trough were installed.

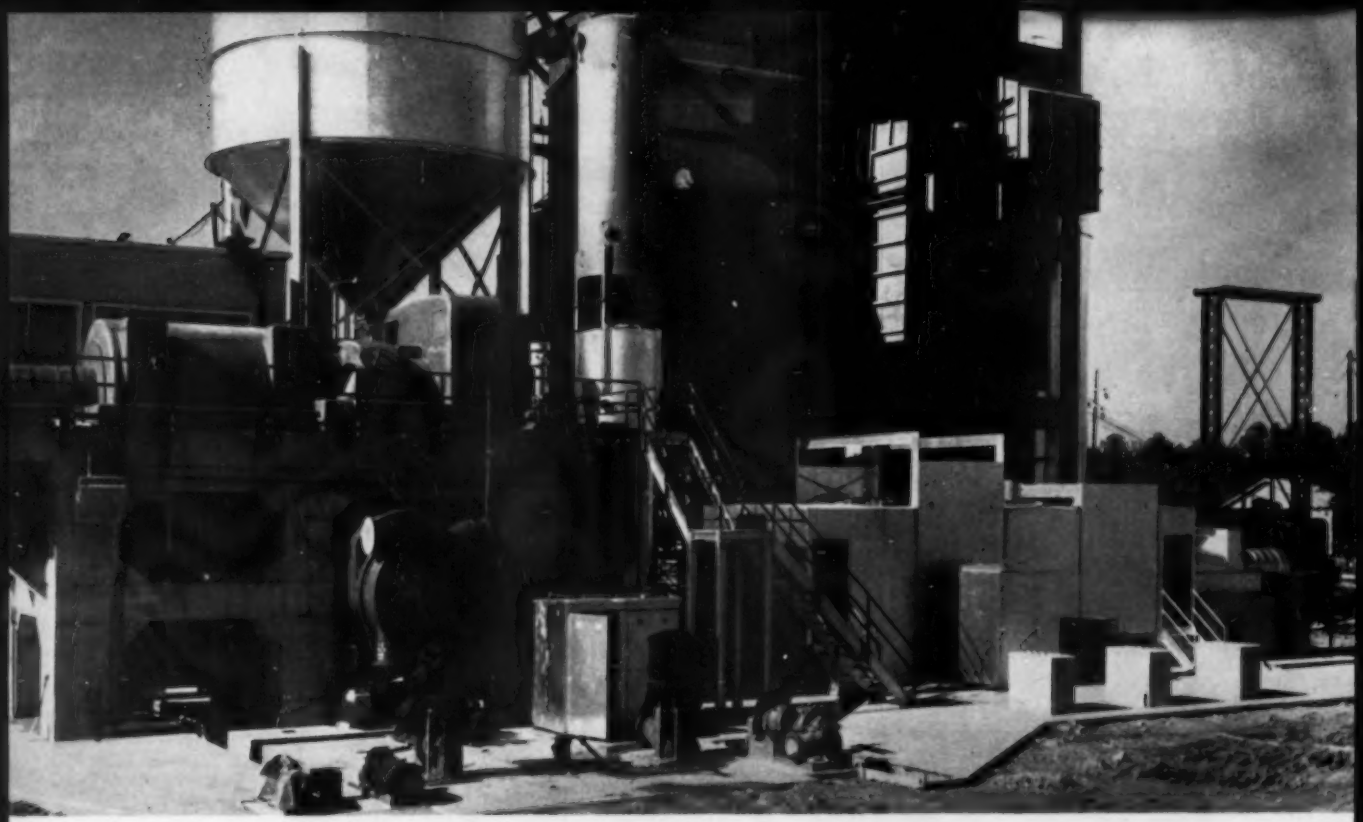
The Cope supports are of galvanized steel that offers greater strength than other metals, and the connector is quick and simple. This connector is a steel pin that is driven between interlocking barrels that are welded to the sides of the trough or ladder. If necessary, the pin can be driven out and reused. An aluminum plate is furnished to fit over the bottom of the trough and protect the cable insulation. A connection can be made in a minute of two. It is possible to make several such connections on the floor and then lift an entire run into position.

Metal Grating Handbook

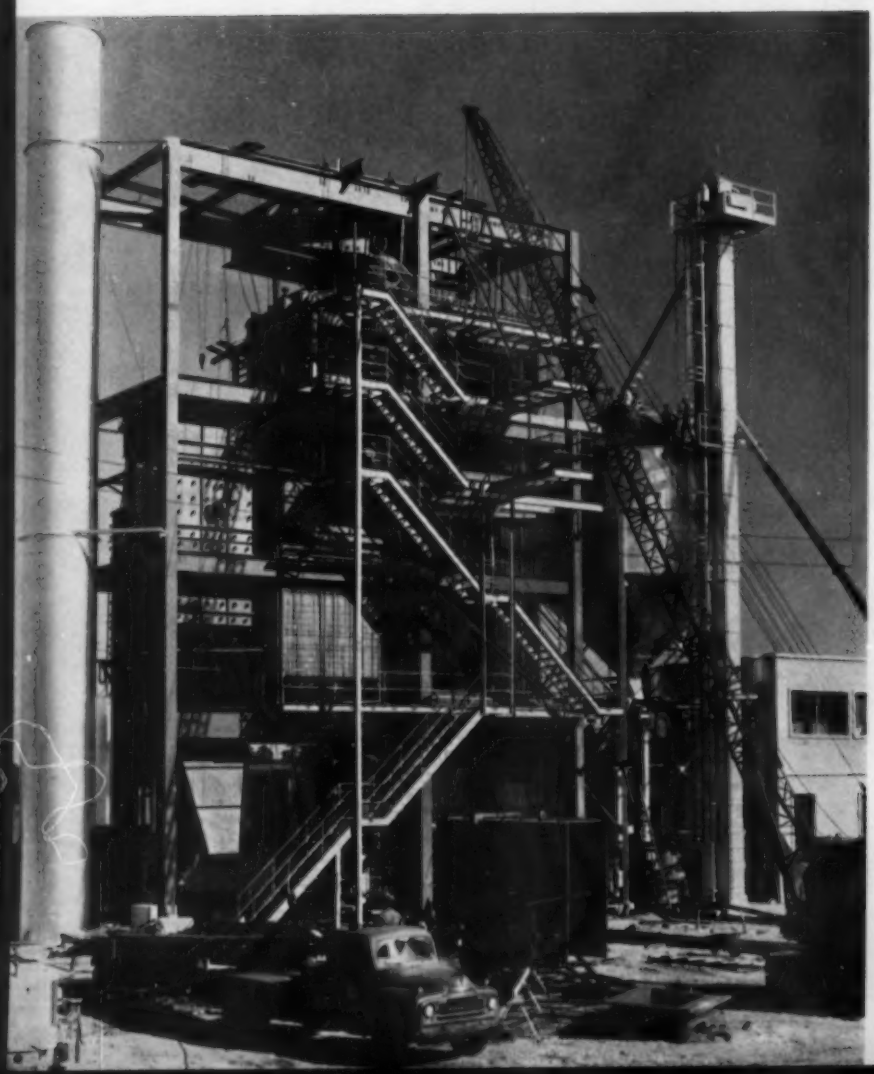
A NEW "Metal Grating Handbook" will find wide application in a variety of industries by those who specify, buy, or use metal grating and treads.

The technical guide, prepared with the cooperation of eight leading grating and tread manufacturers, features drawings, tables, standards, specifications, installational views and a glossary of terms and definitions used throughout the industry.

The 32-page "Metal Grating Handbook" is available at $1 per copy from Metal Grating Institute, Inc., One Gateway Center, Pittsburgh 22, Pa.



View of Warwick Station of Crisp County Power Commission. In the background are the control house, coal hopper, and outdoor boiler. In the foreground are the 12,500 kw steam turbine generator and the enclosed 5000 kw gas turbine with outdoor generator and exciter.

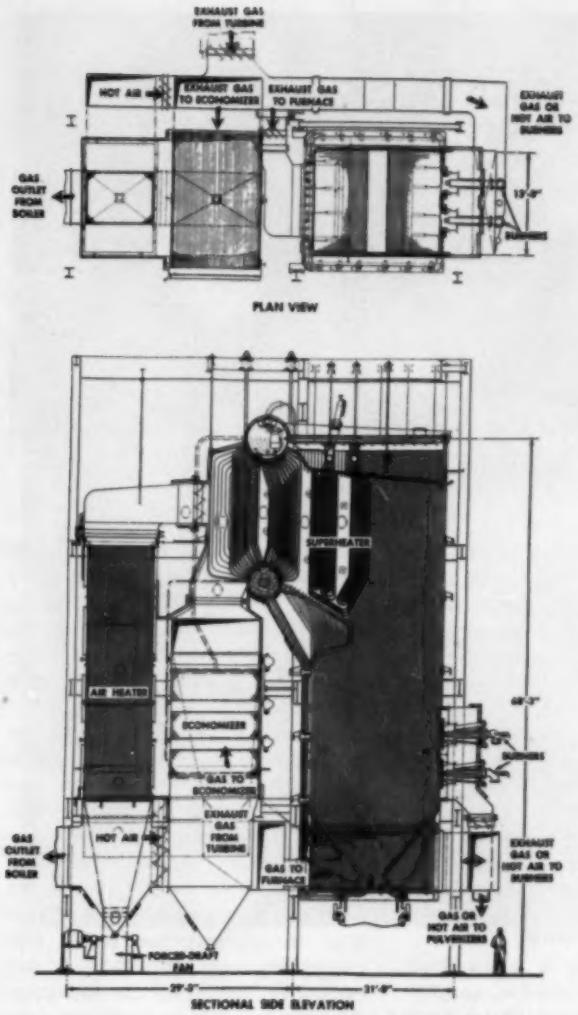


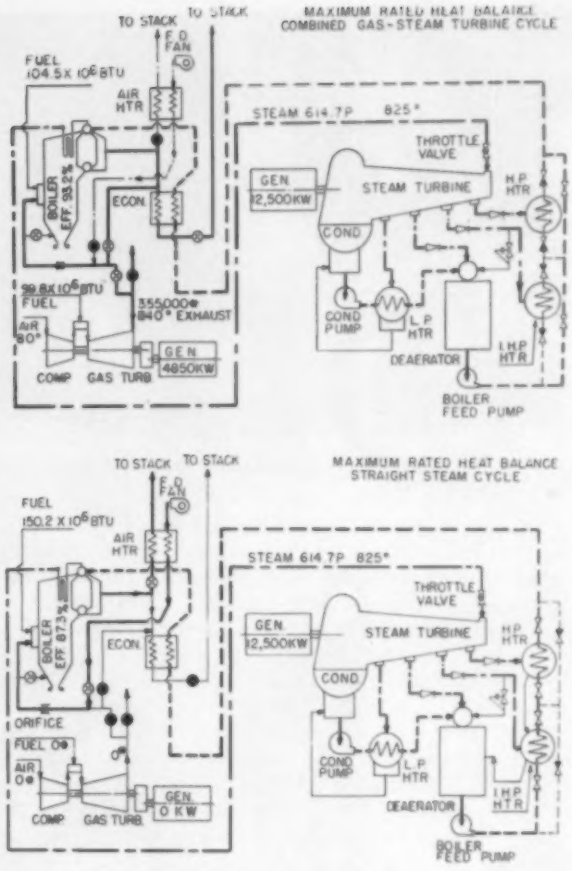
New Cycle

A GAS-TURBINE generator and conventional steam-turbine generator will operate in a combined cycle in a 15,000 kw plant being constructed at Warwick, Ga.

The plant was described in a talk at an ASME Central Savannah River Area Section Meeting

Photograph at left shows the outdoor boiler erection nearing completion.





Drawings at left show the steam generator for the combined gas-steam-turbine cycle plant. Flow diagrams show operations with and without the gas turbine in service.

for Gas-Steam-Turbine Plant—Ga.

by W. D. Sinclair, manager of the Crisp County Power Commission of Cordele, Ga., which will operate the plant. Details are from a report prepared by W. J. Whatley, Mem. ASME, mechanical engineer, Patchen & Zimmerman, Augusta, Ga.

The combination resulted from research for a reliable, economic, and efficient cycle which will satisfy a daily peak condition, together with the base-load requirement, during low-water periods when the hydro-electric system owned by the Commission is inoperative.

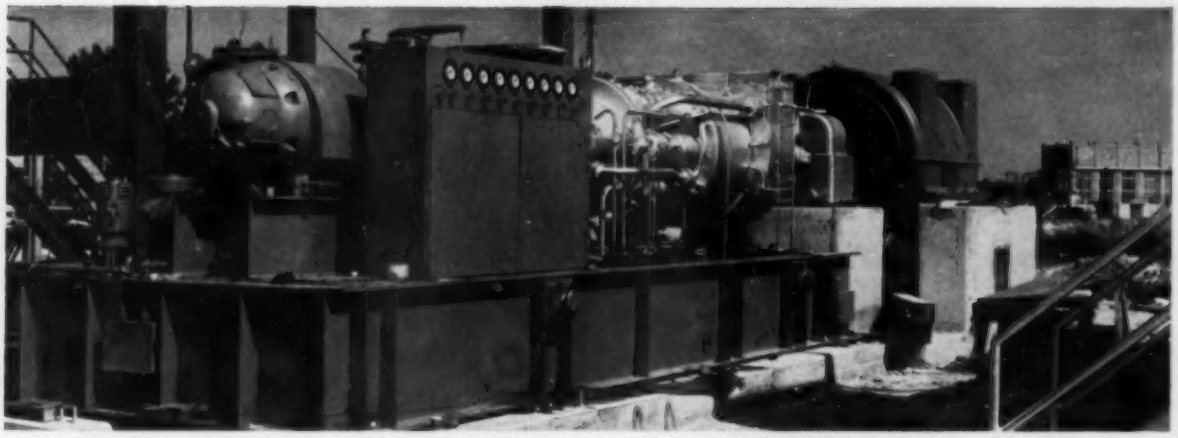
The new plant will be located adjacent to the hydro station on Lake Blackshear, where ample cooling water will be available and combined operation under one supervisor will be possible.

Steam-Boiler

A unique steam-boiler arrangement has been developed by the Babcock & Wilcox Company to operate in the combined gas-steam-turbine cycle, utilizing some of the Btu's in 355,000 lb of gas per hr, which exhausts from the gas turbine at 840 F to increase cycle efficiency.

The boiler was designed to produce 130,000 lb of steam per hr at 625 psig and 825 F, either when firing pulverized coal, natural gas, or oil alone, or in combination with the exhaust from the gas turbine.

The exhaust from the gas turbine containing about 16 per cent O_2 is suitable for further use as preheated combustion air. Since



View of gas turbine and accessories, and gear and generator on slab foundation.

the exhaust gas contains more oxygen than is required for combustion of the auxiliary fuel in the boiler, some of it must be bypassed around the burner windbox. A portion is tempered with room air to make it possible for drying and transporting the coal in the pulverizer, and becomes primary burner air.

Some of it also enters the furnace through the hopper bottom, serving to maintain steam temperatures at loads down to 90,000 lb of steam per hr. That part of the gas-turbine exhaust which bypasses the boiler mixes with the boiler exit flue gas and enters the economizer, where further heat is recovered before it passes to the stack.

The boiler is designed for pressure operation on the gas side, eliminating the need for an induced-draft fan so that, during combination conditions, only the fans for the pulverizers are required, thus reducing auxiliary-power consumption.

When the gas turbine is not running, a tubular air heater is used to provide hot air for combustion and drying of wet coal in the pulverizer. Under these conditions, a forced-draft fan is required.

The two pulverizers are sized so that only one is required when the gas turbine is in operation; however, both are required for full-load requirements when the gas turbine is not running.

The General Electric Company's steam turbine is basically of the high-efficiency, impulse design. Maximum rating is 12,500 kw, 3600 rpm, straight condensing, designed for steam conditions of 600 psig, 825 F, and 2 in. Hg abs back pressure. Full-load steam rate at the throttle is 8.93 lb per kwh during combined gas-steam-turbine operation.

The steam-driven generator is rated at 12,500 kva, 0.8 pf, 13,800 volt, 3-phase, 60 cycle. It has four corner-mounted vertical air coolers and a direct-connected exciter.

Gas Turbine

The gas turbine is a standard General Electric 5000-kw, simple-cycle, single-shaft unit, designed for operation on natural-gas fuel, rated 6900 rpm at 80 F compressor-inlet temperature and 14.17 psia compressor-inlet and turbine-discharge pressure.

The generator is rated 6250 kva; 0.8 pf, 2-pole, 3-phase, 60 cycle, 2400/4160 volts; 3600 rpm. The generator is driven through a high-speed high-precision double-helical single-reduction gear at 6900/3600 rpm.

Feedwater Heating

The feedwater cycle is designed to operate with four stages of regenerative heating. The calculated expected flows, pressures, and temperatures at different points in the system, as well as the anticipated heat rate for the combined gas-turbine steam-turbine cycle are indicated on the diagram.

The condensed steam from the hot well of the main surface condenser is pumped through the inter and after condensers of the steam-jet air-removal ejectors, then through the low-pressure, horizontal, closed feedwater heater, and then to the deaerator-type open heater.

The boiler feed pumps will obtain suction from the deaerating-heater reserve-water storage and pump directly to the boiler economizer, by-passing the two high-pressure closed feedwater heaters.

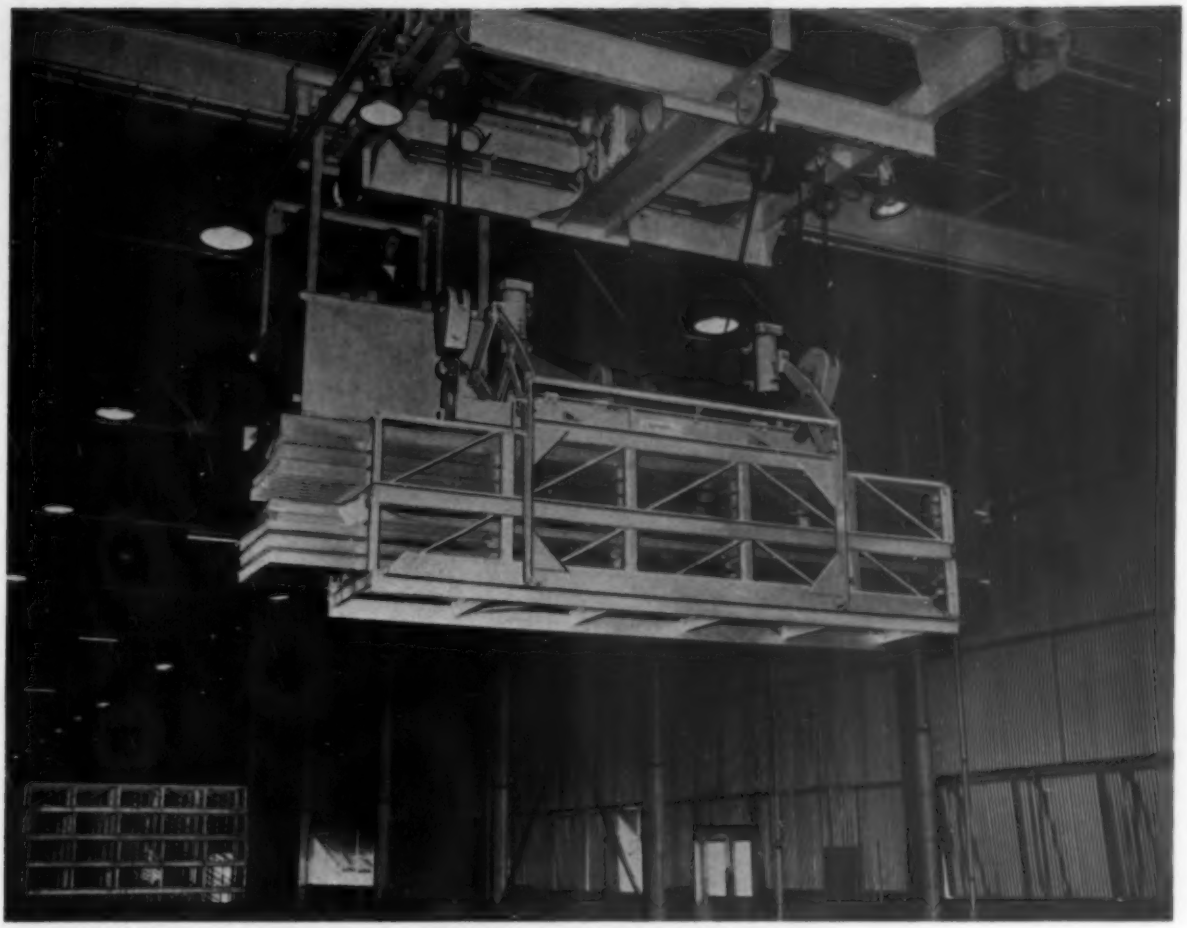
Feedwater flowing through the economizer absorbs additional heat to increase the boiler efficiency by approximately 6 per cent. Drainage from the low-pressure heater will be automatically returned to the surface condenser after being cooled in the drain-cooler section of the low-pressure heater.

The straight steam-turbine cycle is shown in the other figure. Condensate from the condenser hot well is pumped through the inter and after condensers of the steam-jet air-removal ejectors, then through the low-pressure feedwater heater and on to the deaerator.

Boiler feed pumps will obtain suction from the deaerating heater and discharge the feedwater successively through the i-h-p and

(*Continued on Page* 79)

Technical data in this article is abstracted from Mechanical Engineering for Jan. 1958. Photographs were provided by W. D. Sinclair, Manager of the Crisp County Power Commission.



HANDLING ALUMINUM BAR . . . . . Reynolds Metals, Richmond

RACKS loaded with aluminum bar extrusions are moved quickly and safely with specially-designed rack tongs at the Richmond Extrusion Plant of the Reynolds Metals Company.

In the plant, at Bellwood, near Richmond, Va., extrusions are loaded on racks at the run-out table and carried to the aging furnaces; after aging, they are carried on the racks to the storage area.

Manufactured by Heppenstall Company, the tongs will lift two of the 15 ft racks at a time, with one riding "piggy-back." Extrusions up to 36 ft long are handled by bolting two racks together in tandem fashion. With this arrangement, four racks can be lifted at once. The racks weigh 600 lb each and normally carry a load of 800 lb each, so that with a four-rack lift, the tongs carry a total load of 5,600 lb.

Operation of the tongs is controlled by the craneman from his cab. To pick up a load, he lowers the tongs with their jaws open, positioning them so that the jaws are opposite a channel along each side of the bottom of the rack to be lifted. He then operates an electric motor which causes the jaws to close, fitting into the channels of the rack, permitting the rack (with or without another rack above it) to be lifted in safety. When the rack is delivered at its destination, resting either on the floor or interlocked on top of another rack, the motor is reversed, causing the jaws to open, so the tongs are ready for another load.

A centrifugal clutch prevents excessive pressure by the jaws, avoiding damage to the rack or the motor. Once closed on a load, the jaws cannot open again until the motor is operated by the craneman, because of an automatic brake.

Jaws of the tongs move in and out in a straight line, reducing the amount of clearance required alongside each tier. An aisle space of 15 in. between tiers is sufficient. Racks are tiered six-high, making maximum use of the storage space.

The tongs are supported on 5-ton cranes manufactured by Industrial Crane and Hoist.

Check Up – Now!

how to locate EXPLOSION HAZARDS in your plant

CHECK YOUR answers to these questions . . . then turn to page 52 and read the evaluation of the hazard potential in your plant . . . based on findings of the National Fire Protection Association.

1. Does your plant use any flammable vapors, gases or volatile liquids?

YES ☐ NO ☐ DON'T KNOW ☐

2. Is there in your plant any process which releases flammable vapors or gases at any time . . . even momentarily?

YES ☐ NO ☐ DON'T KNOW ☐

3. Is any of the electrical equipment in the hazardous areas described in Questions 1 and 2 more than 25 years old?

YES ☐ NO ☐ DON'T KNOW ☐

4. Is the explosion-proof electrical equipment in each of the hazardous areas of your plant designed for that specific area?

YES ☐ NO ☐ DON'T KNOW ☐

5. Has any operation involving flammable materials recently been moved to a new location which was not previously electrically explosion-proof?

YES ☐ NO ☐ DON'T KNOW ☐

a. Has that location been appraised for electrical explosion-proofing?

YES ☐ NO ☐ DON'T KNOW ☐

6. Is any of the explosion-proof electrical equipment in your plant of gasketed-joint construction?

YES ☐ NO ☐ DON'T KNOW ☐

7. Have you begun using any new or different types of solvents, gases or vapors in plant processes during the past year?

YES ☐ NO ☐ DON'T KNOW ☐

a. If so, has the area affected been re-appraised for electrical explosion-proofing?

YES ☐ NO ☐ DON'T KNOW ☐

8. Are the electrical conduits connecting hazardous and non-hazardous areas *sealed off* — without exception? Are *all* conduits connecting explosion-proof switches and circuit breakers sealed?

YES ☐ NO ☐ DON'T KNOW ☐

9. Does your plant contain any of the many combustible *dusts* which in certain concentrations could become explosive? (Some of these are: starch, wood flour, pulverized coal, magnesium and aluminum powder, pulverized sugar, cocoa and spices, dried egg and milk powders, potato flour, dried hay, meal from beans and seed, and grain and grain products.)

YES ☐ NO ☐ DON'T KNOW ☐

10. Is your dust-tight electrical equipment constructed to dissipate heat rapidly — preventing high surface temperatures even when blanketed with dust and functioning at full rating?

YES ☐ NO ☐ DON'T KNOW ☐

11. Has a fire insurance company made a thorough *electrical* inspection of your plant in the past two years?

YES ☐ NO ☐ DON'T KNOW ☐

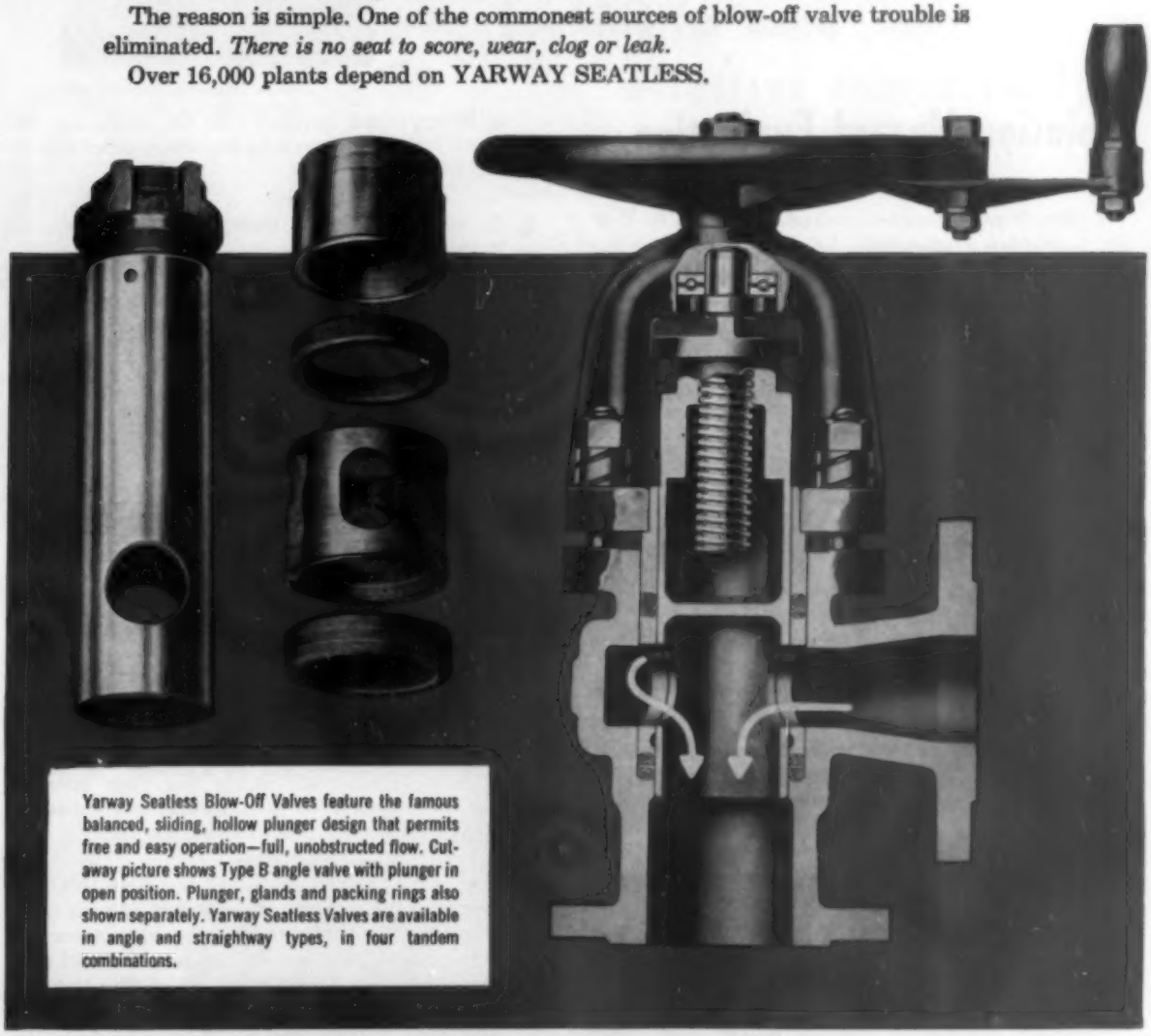
12. Is someone in your plant assigned the responsibility of determing what constitutes an explo-

seatless means savings

For nearly 50 years boiler plants in low and medium pressure ranges have been saving maintenance time and down-time thanks to dependable, trouble-free blow-down service from Yarway Seatless Blow-Off Valves.

The reason is simple. One of the commonest sources of blow-off valve trouble is eliminated. *There is no seat to score, wear, clog or leak.*

Over 16,000 plants depend on YARWAY SEATLESS.



Yarway Seatless Blow-Off Valves feature the famous balanced, sliding, hollow plunger design that permits free and easy operation—full, unobstructed flow. Cut-away picture shows Type B angle valve with plunger in open position. Plunger, glands and packing rings also shown separately. Yarway Seatless Valves are available in angle and straightway types, in four tandem combinations.

For information on Yarway Seatless Valves, sizes, materials, pressures, etc., write

YARNALL-WARING COMPANY Home Office: 116 Mermaid Ave., Phila. 18, Pa.
Southern Representative: Roger A. Martin, Bona Allen Bldg., Atlanta 3, Ga.

YARWAY SEATLESS ...a good way to specify blow-off valves

Safety "Check List" . . .

sion hazard . . . what hazards actually exist . . . and to work with your electrical engineer in determining what equipment should be used in each case to prevent electrically-ignited explosions?

YES ☐ NO ☐ DON'T KNOW ☐

13. Do your answers to the questions above indicate a need for a fresh look at the explosion risks in your plant, and their possible consequences?

YES ☐ NO ☐ DON'T KNOW ☐

Note: These questions and answers adapted from HAZARD FINDER, a new 8-page folder recently produced by Crouse-Hinds Company, Wolf & Seventh North Sts., Syracuse, New York. Copies are available — write Dept. HF, Crouse-Hinds Company.

Explosion Hazard Evaluation

Study your answers — and locate the hidden probabilities of electrically ignited explosions in your own plant.

HERE IS an evaluation (based on findings of the National Fire Protection Association) of the hazard potential in your plant. Questions are on page 50.

1. You should make sure of this one. Some substances not usually thought to be flammable ARE flammable under certain conditions — which may from time to time be present in your plant.

2. However rarely this condition may occur . . . once is too often. Better check. Every one is a potential explosion hazard.

3. If it is over 25 years old, chances are dangerously high that it is *not explosion-proof*. Very little of this equipment was available prior to 1930.

4. This is important. Equipment designed for use with one group of gases or vapors is often unsafe in the presence of another, according to Underwriters' Laboratories tests.

5. A common oversight, especially with such easily-overlooked items in the new location as lighting switches, telephones, warning lights, etc.

6. Gasketed joints are *not* explosion-proof. Such equipment should be replaced *at once*.

7. Thorough analysis of their characteristics — flash point, ignition temperature, etc. — should be established for firm classification as hazardous or non-hazardous.

a. Re-appraised not only for the need, but for exactly the right type of explosion-proof equipment.

8. An electrical conduit entering a hazardous area from a non-hazardous area becomes a long fuse if the vapors inside are not sealed off at the point of entrance. Seals confine an explosion in an arcing device to prevent its spreading to other parts of the conduit system.

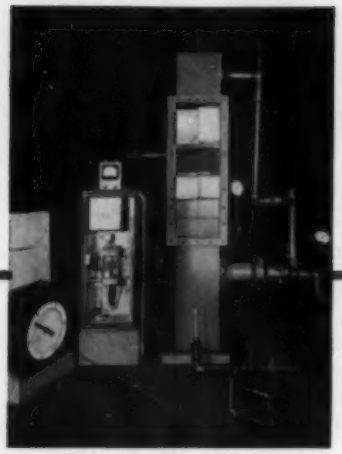
9. Suspension in air of sufficient tiny dust particles can form a mixture as explosive as many vapors or gases.

10. High surface temperatures cause drying and carbonization of settled dusts which may lead to combustion. Modern dust-ignition-proof equipment is designed in accord with U.L. requirements for rapid, effective dissipation of heat — and *in addition* is streamlined to prevent dangerous accumulations of dust.

11. This should be standard procedure at regular intervals, or whenever any change is made in plant layout, equipment, processes, or materials. Who is better qualified, or has your interests more at heart, than your insurance companies? Make *full use* of their expert advice!

12. According to need, write off the time this man spends on hazard-control as a part of your plant insurance premium — which may be favorably influenced by his presence, anyway! He will need to refer to Articles 500 and 510 of The National Electrical Code, standard definition of hazardous locations of all classes.

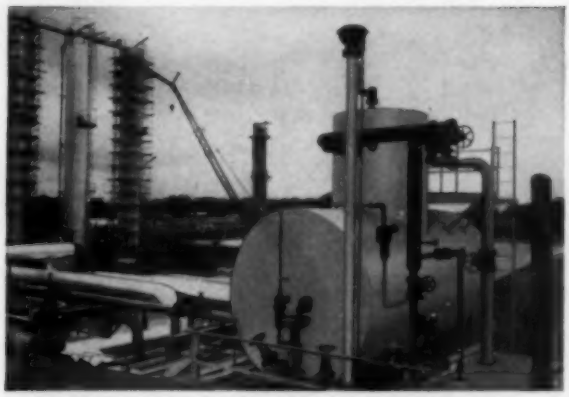
13. ONLY YOU CAN EVALUATE THIS ONE! We can only suggest that the cost of proper explosion-proof or dust-tight equipment is very tiny compared to the risks involved in lives, plant, equipment and public good will. Remember: "Costs of explosions *can't* be budgeted . . . THEIR PREVENTION *CAN!*"



Pilot tray-type deaerator shown with continuous oxygen analyzer in test setup.

ALLIS-CHALMERS DEAERATORS

Looking for more effective deaeration?



Outdoor installation of Allis-Chalmers deaerator in southern chemical plant.

● If so — you'll be interested in the continuing research program at Allis-Chalmers to evaluate all factors in the design of deaerators.

This program includes the use of a specially built pilot deaerator with automatic oxygen analyzer and recorder. Operating factors and deaerating compartment design can be varied to study length of spilling edge of trays, heating area and method of flow. Results obtained with this setup are quickly translated into deaerators designed for optimum performance.

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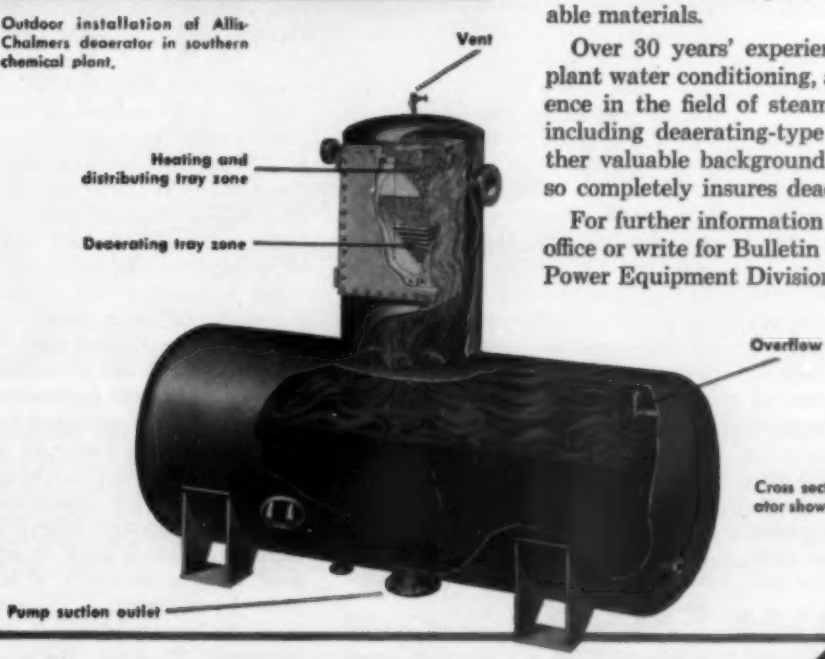
Over 30 years' experience in the field of power plant water conditioning, and over 75 years' experience in the field of steam power plant equipment including deaerating-type condensers, provide further valuable background. No other manufacturer so completely insures deaerator performance.

For further information contact your nearby A-C office or write for Bulletin 28B8853, Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.



Cross section of tray-type deaerator shows water and steam flow.

ALLIS-CHALMERS

A-5674

The Status of Nuclear Power

Why is it needed? . . . What is it? . . . What will "fuel" cost? . . . Can it be made safe? . . . How is it being financed and promoted?

Abstracted by JOHN F. LEE, Professor of Mechanical Engineering, North Carolina State College, Raleigh, N. C., from remarks by W. KENNETH DAVIS, Division of Reactor Development, U. S. Atomic Energy Commission.

CORRECTION of the widespread misunderstanding about the status and prospects of nuclear power development is essential to the future success of the program. Many people are now convinced that the large-scale use of nuclear power which will solve all of our energy problems is just around the corner and that if someone could just straighten out those "bungling bureaucrats" in Washington the whole thing would be solved.

As a matter of fact, however, nuclear power for civilian uses is still in the research and development stage — and so far as utilization in the United States is concerned, it is in only the *early stages* of research and development.

The situation in the United States is *not* characteristic of many other parts of the world. In Great Britain, Western Europe, Japan, and in other areas where relatively cheap fossil fuels are not in abundant supply, they must have new sources of electric power almost regardless of the cost. Fortunately, it appears that nuclear plants can provide such power at a cost which though not cheap is well within reason.

While we can make a valid distinction between the relative urgencies of nuclear programs here and abroad from the point of view of fuel supplies, we must interject some qualifying thoughts.

Our fossil fuels are not inexhaustible nor are they necessarily in the optimum locations. Moreover, they represent a resource for important uses other than energy. For example they are needed as chemical raw materials for some very important industrial processes.

Our demands upon our reserves of oil, gas, and coal for both energy and other purposes are increasing at an almost unbelievable rate. This may mean that we will be in the same situation as other industrialized countries long before we had expected to be.

As we are now able to visualize it, nuclear power will not supply more than a relatively small portion of our future energy requirements. Only some 15% of our energy supplies are used today for the generation of electric power and we cannot reasonably expect all of our future electric power to be supplied by nuclear plants. The remaining 85% of our fuel supplies goes for such uses as space and process heating, power for ships and locomotives, and fuels for autos, trucks, busses, and aircraft.

Although nuclear power may eventually be able to supply part of this demand, a realistic examination will show that in the foreseeable future it can be only a small part.

Potentialities

What are the essential characteristics of nuclear energy which lead to its importance and to the technical problem in its development?

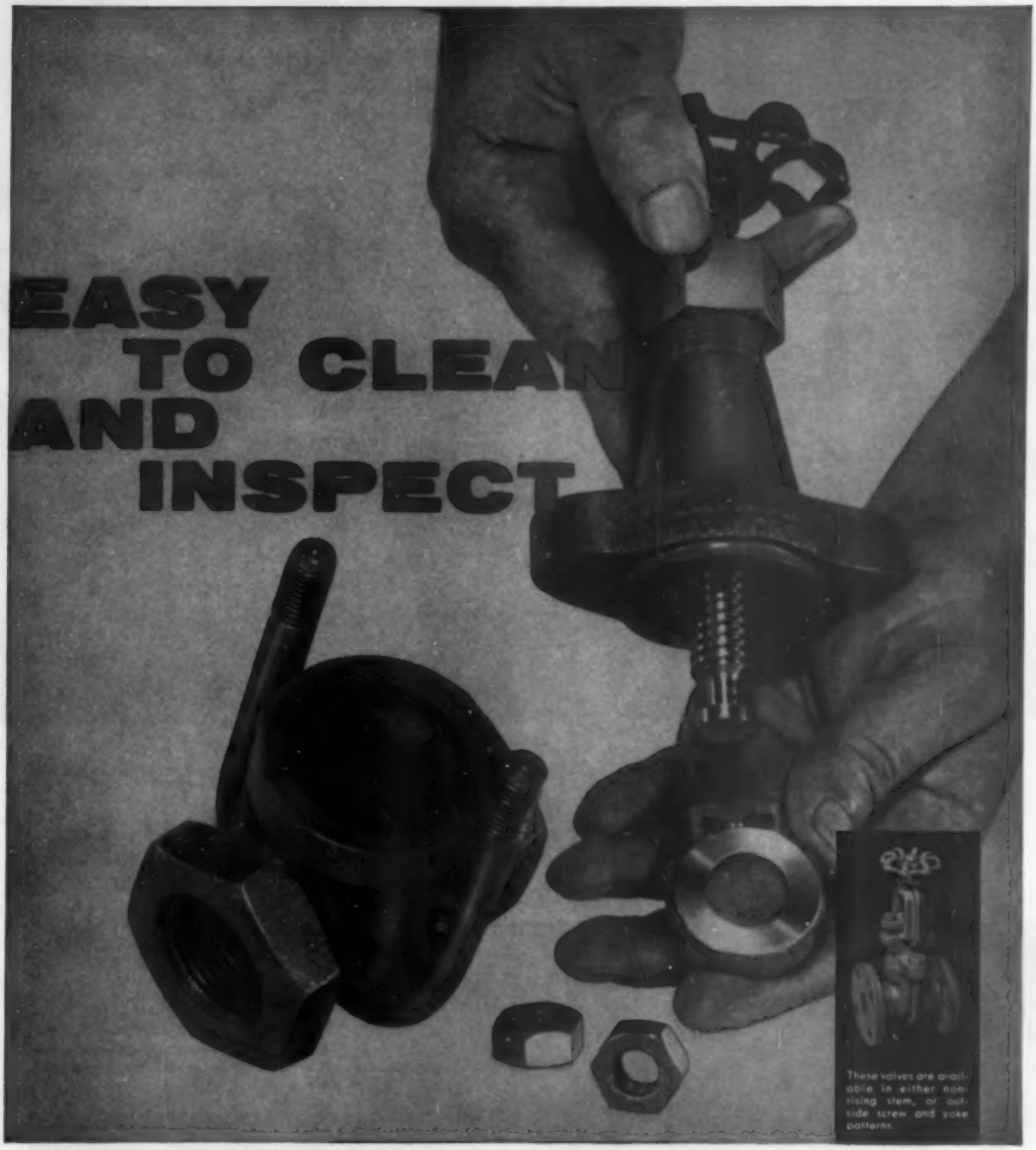
A very large amount of energy is released by a neutron-induced fission reaction. It is equal to about 80,000,000 Btu per gram of material fissioned, about 2.6 million times as great as the energy produced from an equivalent weight of coal.

The potentialities of nuclear reactors are immediately apparent. They include the possibility of very compact sources of large amounts of heat. They only need to be refueled after very large amounts of heat have been released, and they do not require air or other outside materials such as are needed to effect conventional combustion.

Most important of all, there is the potentiality of being able to produce energy for a very low fuel cost. Uranium can be mined and purified at a cost of something like $40 a kilogram at the present time so that if all of the U-235 in it could be consumed the heat produced would only cost about 7 cents per million Btu. This compares with a heat cost for coal of about 25 cents per million Btu.

Potential nuclear fuel costs can be even lower. Some of the neutrons which are not needed to maintain the chain reactions and which are not lost or captured in other materials can be utilized to produce additional fissionable material. This is accomplished by capturing the spare neutrons in so-called fertile materials which then become fissionable themselves.

In some reactors where every possible means is used to achieve good neutron economy it is possible by conversion to produce more fissionable material than is consumed. These are the so-called breeder reactors. Most other types of power reactors will produce 70 to 85% as much fissionable mate-



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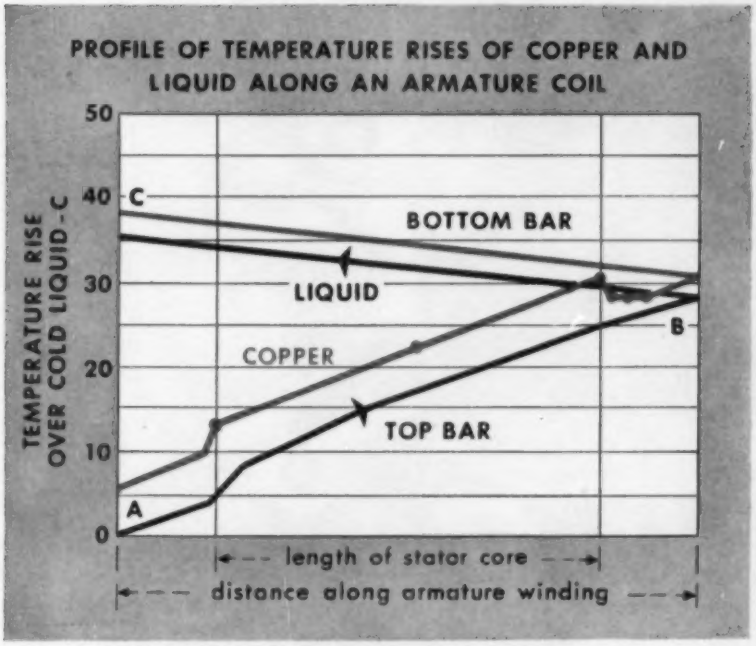
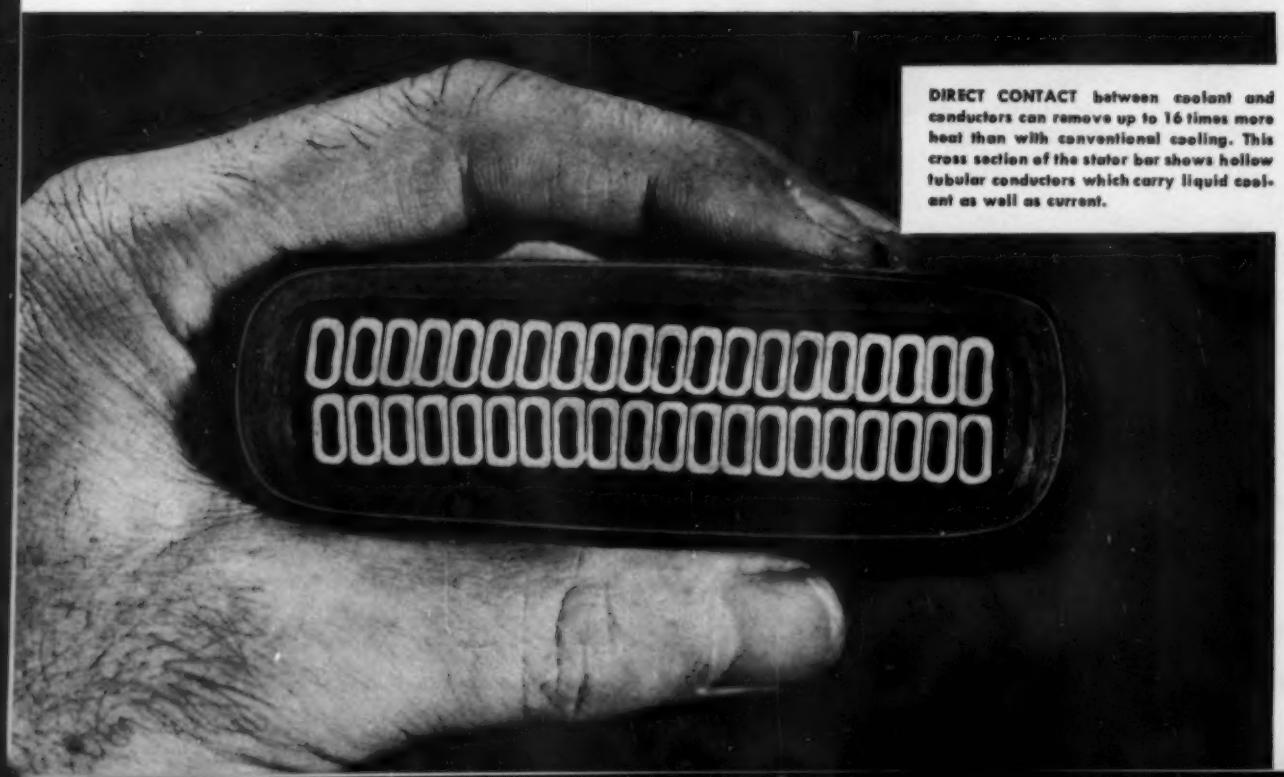


AUTOMATIC TEMPERATURE REGULATION of stator is permitted with liquid cooling. This chart shows how copper temperature remains within a few degrees of the liquid coolant.

IMPROVED HEAT REMOVAL in conductor-cooled stators helps keep units like this on-the-line and operating at top efficiency. Pictured here is a General Electric steam turbine-generator unit installed at Virginia Electric and Power Company's Yorktown Station. It has a rating of 200,535 kva at 30 pounds hydrogen pressure.

WITH GENERAL ELECTRIC CONDUCTOR-COOLED GENERATOR STATORS . . .

Liquid cooling removes up to 16 times



DIRECT CONTACT between coolant and conductors can remove up to 16 times more heat than with conventional cooling. This cross section of the stator bar shows hollow tubular conductors which carry liquid coolant as well as current.

more heat, permits higher unit ratings

HOLLOW-STRAND STATOR BARS HELP IMPROVE GENERATOR PERFORMANCE

First placed in operation in 1956, liquid-conductor-cooled stators are proving to be one of the most significant advances in generator cooling since hydrogen cooling was introduced some 20 years ago.

Improved Hollow-strand stator bar construction plays an important role in liquid cooling. By providing direct contact between the cooling liquid and the copper current-carrying conductors, *up to sixteen times more heat can be removed than with conventional cooling.* The result is higher generator ratings without appreciable size increase.

Design Features such as use of Micapal insulation for improved dielectric characteristics, bar transposition for uniform temperature, high temperature brazing of liquid connections to prevent leakage, and non-corrosive characteristics of the coolant for longer life, all contribute to more dependable operation.

Improved heat removal for better generator performance is just one of many features of General Electric liquid-conductor-cooled generator stators. Other outstanding advantages are:

Design Simplicity—*Despite higher ratings made possible by liquid cooling, the dielectric system maintains the simplicity and dependability of conventionally-cooled machines.*

Reliable Performance—*Liquid cooling permits automatic regulation of temperature independent of load.*

Dependable Operation—*Closed cooling system minimizes chemical contamination and helps prevent foreign material from entering the system.*

Shorter Maintenance Inspections—*Simple single-stage, low-pressure hydrogen circulating fans permit easy inspection.*

For more information on liquid cooling, write for GER-1231. Large Steam Turbine-Generator Department, General Electric Co., Schenectady 5, N. Y.

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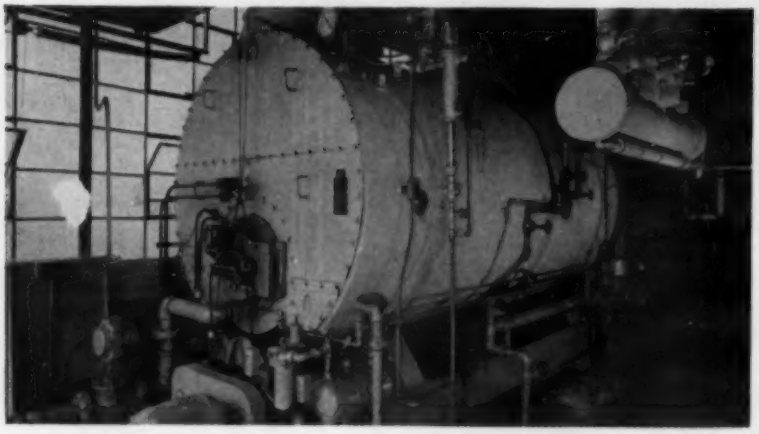
Cleaver-Brooks reports on PROCESS STEAM ECONOMY



34 BOILERS – excellent efficiencies minimum maintenance

— National Industrial Laundries, Elizabeth, N.J.

Mr. Freeman A. Godfrey, Chief Engineer, National Industrial Laundries, states, "From actual fuel checks against steam developed, our company is experiencing excellent efficiencies from our 34 Cleaver-Brooks. Loads vary widely in our 20 plants, starting at 100% capacity in the morning hours and reducing to 20% in afternoon.

"Our maintenance story is just as impressive. Due to better combustion, we find it is unnecessary to clean the fireside of boilers more than once every six months. We have not had a serious shutdown due to any lack of emergency service from your field engineers."

Economy and boiler performance like this are typical of hundreds of Cleaver-Brooks installations. Four-pass, forced-draft design has clearly proved its superiority in all types of process steam service.

Today — write for complete information on Cleaver-Brooks boilers: 15 to 600 hp, oil, gas and combination oil/gas firing, steam or hot water for heating and processing. Cleaver-Brooks Company, Dept. C. 305 E. Keefe Ave., Milwaukee 12, Wisconsin.

The 300 hp oil- and gas-fired model LR boiler shown above is installed at Alabama Overall Service laundry in Birmingham, Ala. In addition to this installation, National Industrial Laundries has a total of 32 Cleaver-Brooks boilers in the following plants:

Atlantic Overall Service Scranton, Pa.
Carolina Overall Service Charlotte, N.C.
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Colonial Overall Service Richmond, Va.
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Dixie Overall Service Greensboro, N.C.
Eastern Overall Service Somerville, Mass.
Floridian Overall Service St. Petersburg, Florida
Gulf Overall Service Atlanta, Ga.
Industrial Uniform Service Chattanooga, Tenn.
Local Overall Service Ft. Worth, Texas
Mechanics Overall Service Newark, N.J.
Mechanics Overall Service Camden, N.J.
Mechanics Overall Service Reading, Pa.
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rials as they consume.

It can be seen immediately that the extent to which we can utilize and preserve our resources of fissionable fuels is dependent upon how much of this breeding or regeneration takes place.

Difficulties

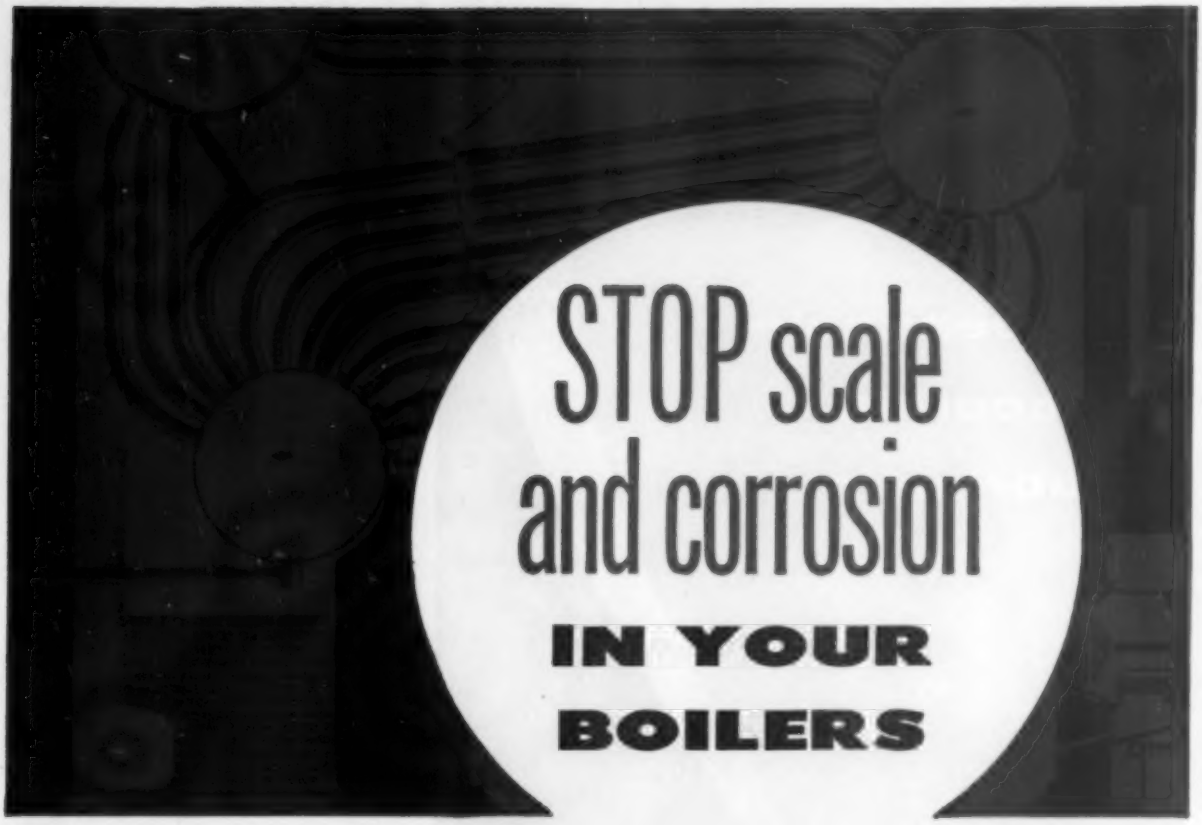
The fuel utilization costs considered thus far are theoretically possible and in the absence of other circumstances might be achieved. The time has now come, however, to confront some of the adverse circumstances that tend to limit the utility of nuclear reactors and very greatly to increase their costs.

The first of these is radioactivity. In addition to producing vast amounts of heat the fission process is accompanied by the release of radioactive energy in the form of gamma rays. The fission products resulting are very highly radioactive. Furthermore, any materials exposed to the neutron gas cloud in the reactor will capture neutrons to some extent and become radioactive. This applies to the fuel materials, the structural materials, any instruments or controls inside the reactor, and to coolants which must be circulated through the reactor to remove the heat. If the fission products are allowed to escape into the coolant they will also, of course, add very greatly to its radioactivity.

Thus the fission process must be conducted inside very heavy shielding (since only mass will stop gamma radiation) and materials emerging from the reactor must also be handled behind shielding. This adds obvious complications to mechanical handling, disassembly and maintenance, chemical processing of partially burnt fuel, etc.

Then fission products and other materials exposed to the neutron cloud must be disposed of somewhere in a safe manner. This is further complicated by the fact that substantial amounts of heat are involved in the radioactive decay.

We are not by any means through with the various types of difficulties. Another nasty fact is that the two fission fragments from a fissioned uranium atom



Every good engineer knows that the costly shut-downs and repairs caused by scale and corrosion can be avoided through the use of the right feed-water treatment. That's why hundreds of the best engineers use Braxon and Flako formulas.

These highly-developed products, based on phosphate or carbonate control, prevent and remove scale in boilers. They also prevent foaming and carryover.

There's an Anderson field representative in your area who has broad experience in every kind of industrial water problem. He will gladly analyze your water and prescribe the proper treatment to protect your equipment against costly corrosion and scale. What's more, he will continue to make periodic analyses to be sure you are being properly protected. The valuable service costs you nothing. It can save you much. Let us know when you would like to see him.

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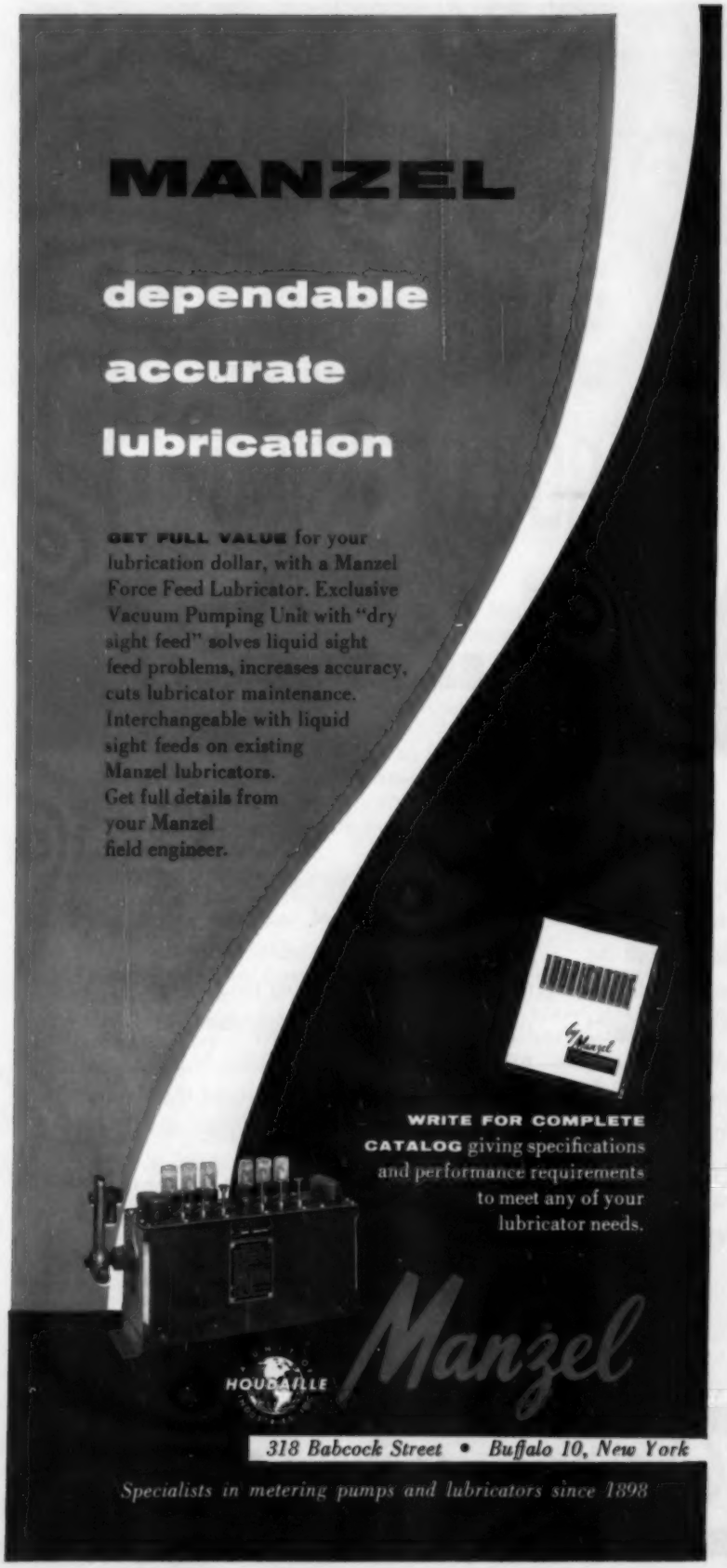
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occupy much more space, by a factor of 3 or 4, than did the uranium atom itself. When one sees the watch-like precision of the parts of a core for a nuclear reactor and visualizes an expansion of a few per cent in the volume of the fuel material he can appreciate the difficulties inherent in this fact.

The fission products range over a wide portion of the atomic table and one clearly has a different material from the point of view of its chemistry, metallurgy, heat transfer, and physical properties after a portion of it has fissioned. These changes in the fuel material as well as the decrease in its mass below the level needed to keep a chain reaction going necessitate removing the fuel and reprocessing it after only a portion has been consumed.

Nor are changes in properties confined to the fissionable material alone. All materials in the reactor are subject to transmutation as they capture neutrons and have their atomic constitution changed. Further, the various radiations are known to affect such things as crystal structure and various surface phenomena such as corrosion.

It is essential to use materials which have a low affinity for neutrons, for fuel cladding, structure, control mechanism, coolants, etc., to avoid non-useful capture of neutrons which would make a chain reaction more difficult and less efficient as a converter. Such low capture materials will also be less affected by long term irradiation in a reactor.

Materials are also needed in most reactors for another important purpose, slowing down the neutrons to a velocity where they can be captured easily by the fissile material. The neutrons simply bounce off these "moderators" until they have lost most of the energy they had when they came out of the splitting uranium atom.

For moderators it is desirable to have light atoms so that the energy lost per bounce will be high and, of course, atoms that will not catch the neutrons. Hydrogen and deuterium (in water), carbon (graphite), and beryllium (as a metal or oxide) are mate-

So far as utilization in the United States is concerned, nuclear power is only in the early stages of research and development. New materials are being adapted to new needs, and new data sheets on physical characteristics must be developed by trial and error.

rials commonly used for this purpose. These same materials can also be used as a reflector around the outside of a reactor to reflect back into the reactor neutrons which might otherwise escape.

A serious difficulty is that most of the special materials needed in reactors for all the various reasons I have described are not well known. This is particularly true of materials subjected to high temperatures and pressures, and especially corrosion.

A whole new technology for production and use of zirconium has had to be developed in order to make available this material which has many of the advantages of stainless steel but only about one-tenth the neutron capture cross section. Even when stainless steel itself has been considered for use in a reactor it has been found that much needed data about it and its use are lacking.

In addition to materials of especially low neutron capture there is also a special need for materials of high neutron capture for use in controlling reactors by poisoning them to a controlled and variable extent. These materials are clearly going to absorb a lot of neutrons and be changed by them. Such little known materials as boron, cadmium and hafnium are used for this purpose. Even less known materials may have applications here.

It is clear from what has been said that the materials problem is a most important one in reactor technology. It should also be clear that it is not one in which rapid progress can be made. Much of the discussion about delays in individual reactor projects and the long time scale for the development of reactors indicates a lack of understanding of this fact.

Financing

The nuclear power program is unique in many ways. One of its most unusual aspects is that in this program the government has committed itself as a matter of national policy to develop a whole new industrial technology which (a) does not have an immediate economic requirement to justify it, (b) will be utilized primarily by privately and publicly-owned utilities already in existence, and (c) must be provided for and supplied by private industrial enterprises. There has been little real understanding of this rather complex situation and its consequences.

It seems apparent that nuclear

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Nuclear Power Problems — Continued

power stations will eventually be treated in most respects just as conventional power plants are today. Individual utilities will have to finance, contract for, operate and maintain the nuclear power stations.

There will of course be problems of operation and maintenance which will necessitate procedures new to the utilities and will require some people with different backgrounds from those of their present employees. During the early years these requirements may be fairly formidable, but in the long run they will become standard.

The utilities will not actually build the plants nor will they do the development leading to their construction. Rather, they will purchase the plants through enterprises which will become established in the business. Some of the old patterns for supplying power plants may be changed and there may be new companies or groups of companies in the business but essential fact is that they will all be private industrial enterprise, such as architect-engineers, construction companies, equipment suppliers and manufacturers.

This pattern of normal business operations is already becoming established in the nuclear power business. This will apply not only to the design, construction, and operation of nuclear power plants but also to the services required for their operation, such as fuel element fabrication, chemical processing of irradiated fuel, and perhaps other specialized services such as radiation control, and analytical work.

The various industrial suppliers, engineers, constructors, processors, and manufacturers will be in competition with one another, and in addition will have pressure from their customers, the utilities, to reduce construction and operation costs. In order to meet these pressures and in order to give the assurances and guarantees customary in normal business relations they will need to have the basic knowledge of engineering and costs which can come only from actual experience with full-scale plants.

The problems of how the suppliers are to acquire the knowledge and know-how to proceed on a commercial basis with the nuclear power plants being developed by the government is a serious one. These suppliers will not be the National Laboratories that are now doing much of the development work for the AEC.

While the AEC is obtaining services and components on a competitive industrial basis as much as possible, this still does not provide the experience necessary in many important areas, particularly that of the over-all physical plant design and construction.

The suppliers could, of course, obtain the necessary experience by developing technology for a given reactor type from the ground up and then building their own reactor experiments and prototype power plants. However, investment of very large sums of money in such developmental and experimental programs would be difficult, if not impossible, for them to justify in the United States where conventional power plants are cheap and efficient, and where conventional fuels are relatively cheap and in adequate supply — and will continue to be for a very considerable time in the future.

However, some utilities and suppliers have felt that they could afford to carry forward some government-developed technology by building modest sized prototype or demonstration reactors of a semi-commercial type on a limited scale, usually with extensive cooperation among several companies, even though the plants probably would not be wholly economic, at least during their early years of operation.

They are counting on their engineering and management abilities to reduce costs over the lifetime of these plants and to provide a basis for later improved plants which it is hoped may be fully competitive.

Electric Heat Speeds Drying — Texas

THE NATION'S leading manufacturer of aluminum and fiber glass boats, Lone Star Boat Company of Grand Prairie, Texas has turned to electric heat as a means of increasing production of fiber glass boat hulls.

An air dry method formerly used was replaced by mounting Chromalox tubular heating elements in the top section of a sheet aluminum canopy. The canopy, when in place, forms the top of an oven with the form for the hull becoming the oven wall. Radiant and convected heat is distributed to the entire inner hull. A Chromalox Input Controller is used to dial the right amount of heat for the application.

Four such ovens are used for the purpose of drying the parting material, gelcoat, and the resin bonding material of the first and second layer of fiber glass

Lone Star Boat Company's electric method of applying heat resulted in a 90% increase in production when used in conjunction with a conveyorized method of handling boats.

Each oven consists of 18 kw in heating elements. Standard threaded fittings were brazed to the element cold end to facilitate mounting of the element and ease of wiring.

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a completely packaged boiler
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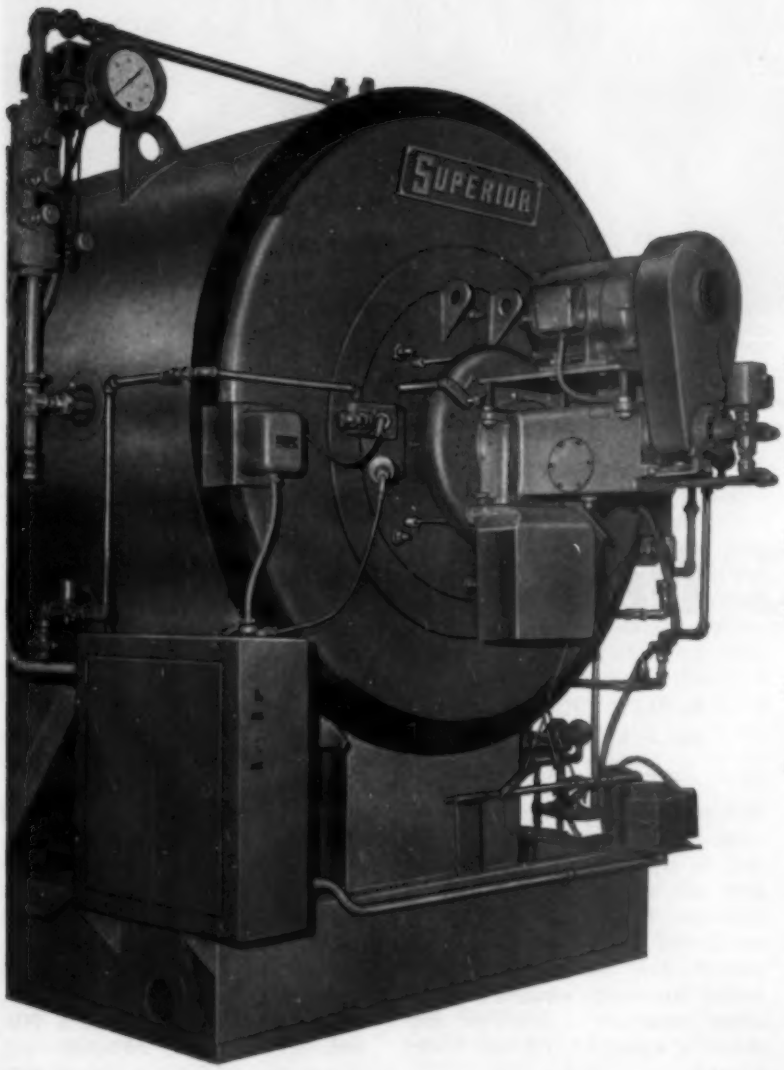

The Superior COMPACT boiler combines reduced over-all dimensions with rugged, practical boiler construction.

Completely packaged and factory fire-tested, the COMPACT is equipped with a dependable Superior Rotary Burner, and has its own quiet, safe, built-in induced draft fan. Compare these COMPACT features with any other boiler in the same capacity range.

- Full 5 sq. ft. of heating surface per boiler horsepower for maximum heat transfer.
- 4-pass down draft design for high velocity gas travel and better water circulation.
- Fully automatic; firing oil, gas or both. Dependable rotary burner reduces maintenance and supervision. Insures fuel economy.
- Smaller outside dimensions allows installation in short or narrow spaces or where overhead is restricted.
- Ample clearance under drum allows easy access for installation and inspection of piping.
- Hinged or davited front and rear provides quick, easy access to tube banks for cleaning or inspection.
- Completely insulated and jacketed. Insulation extends all the way round the main drum.
- High furnace, separated from bottom of boiler by tubes of fourth pass, is safely away from "danger zone" completely eliminating bagging and blistering of furnace which results when mud builds up between bottom of boiler and furnace.

11 sizes from 20 to 200 b.h.p. for pressures to 250 p.s.i. or for hot water operation. Other Superior fire tube units are manufactured in capacities to 600 b.h.p.

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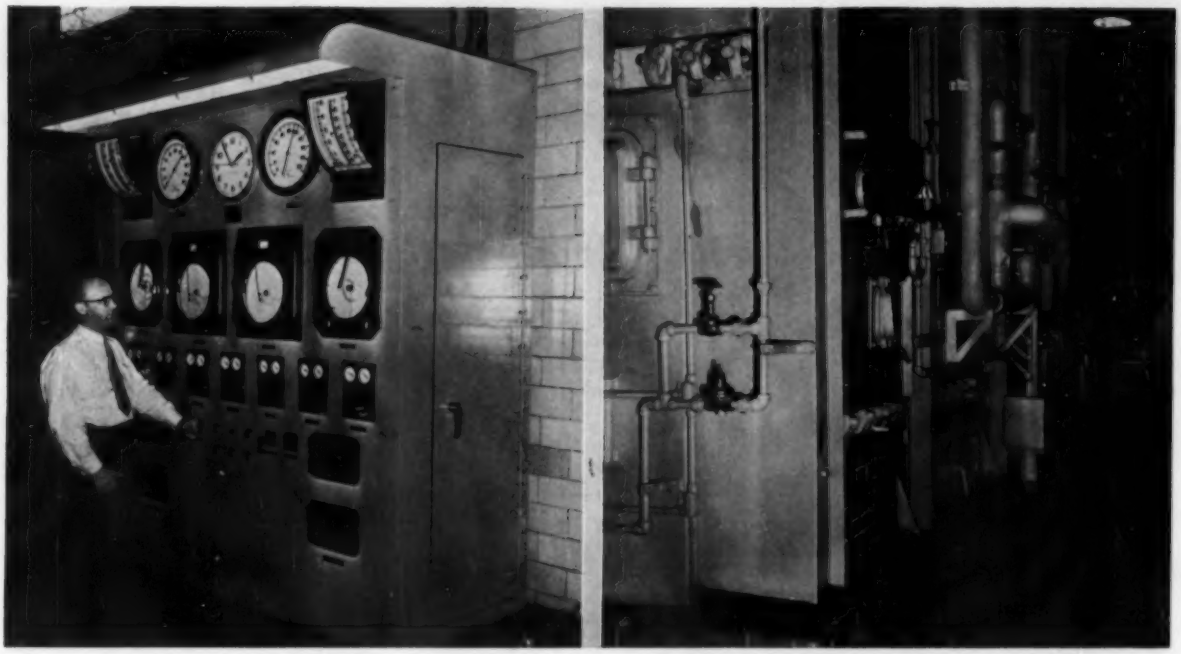


LEFT — Main boiler instrumentation and control stations are mounted on this compact panel in the boiler room. RIGHT — The indicating controller on boiler casing transmits a control signal to the induced draft drive unit, shown in the rear, to automatically maintain furnace draft at the selected set-point value.

Load and Costs Studied for Tennessee Hospital

New Plant Justified

By ALBERT F. G. BEDINGER, Consulting Engineer
and T. K. ROLLINGS, Resident Engineer

OPERATION and maintenance of a hospital boiler plant represent a considerable part of the yearly budget and, when the time comes for building expansion, management must explore the economics of enlarging or replacing the present boiler and heating facilities. Management of St. Mary's Memorial Hospital, Knoxville, Tenn., recognized need for full information when faced with the necessity of adding two new wings and a nurses' home.

The resulting survey showed that the presently connected load required 12,062 lb/hr, and that the new buildings would require an additional 9,795 lb. This made a total of 21,857 lb/hr.

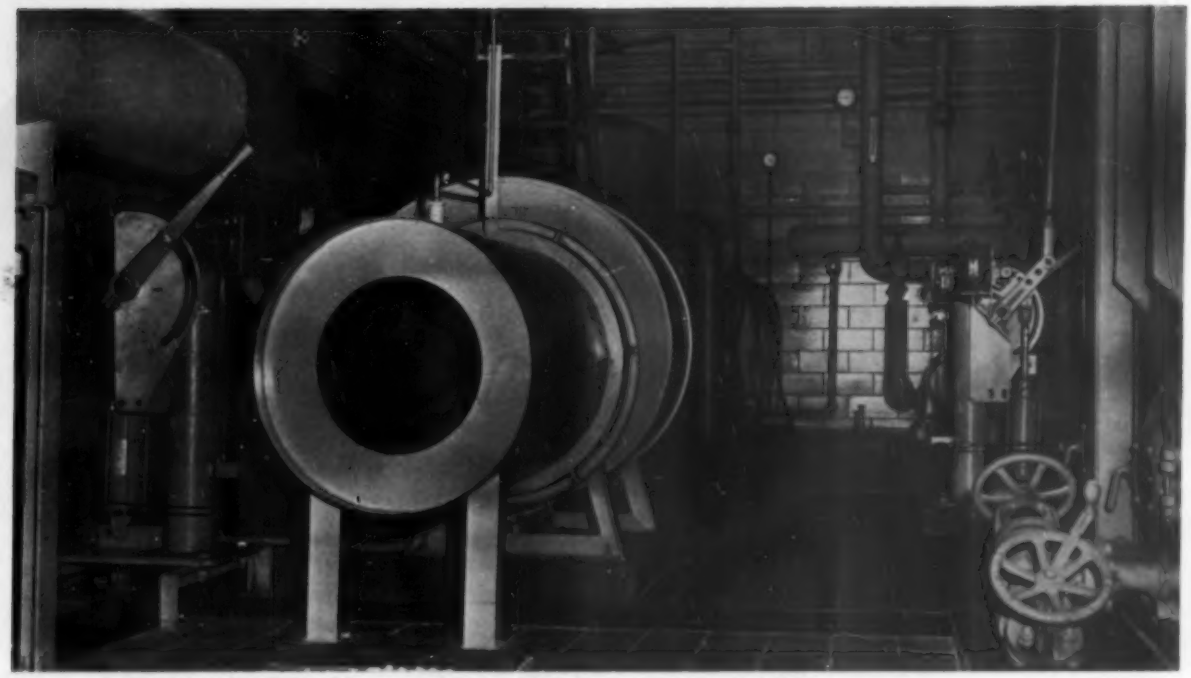
To supplement this study, the resident engineer, together with the consulting engineering firm representative, visited numerous plants of a comparable size within a radius of 300 miles of Knoxville. The purpose of these visits was to study results and investigate the mechanical features of installed boilers and associated equipment such as combustion control, fuel burning equipment, water treatment equipment, and other necessary accessories constituting a modern, efficient boiler plant.

Sound engineering and thorough initial planning enabled the engineers to make specific recommendations which gave the Planning Committee a true picture of the hospital's steam loads and equipment requirements.

Consequently, it was decided to install new boilers and make them fully automatic with combustion and feedwater control furnished by Copes-Vulcan Division, Blaw-Knox Company. It was further decided to burn gas as the primary fuel, with provision for oil as stand-by in emergencies.

Since total steam requirements were found to be 21,857 lb/hr, two 30,000 lb/hr Babcock & Wilcox boilers were installed, and space reserved for a future unit when needed. They are of the two-drum, water tube design rated at 160 psig. Operating pressure is 100 psig.

Boiler settings and wind boxes are designed to permit the installation of underfeed coal stokers when and if desired. Provision for oil firing and the possible future use of coal included the installa-



Master steam pressure controller is mounted on the left wall. In the left foreground is the drive unit which positions the forced draft damper. At the right rear is the drive unit for the induced draft damper.

tion of Vulcan Type P3 manually operated soot blowers.

Fuel feed is controlled by a pneumatic impulse from header steam pressure. Combustion air is controlled by the steam flow-air flow balance, aided by a derivative impulse from fuel loading. A cascade control station provides for adjustment during automatic firing, so that fuel and air can be set at the correct ratio for best efficiency.

Safety features built into the control prevent starting or operating the boilers under unsafe conditions. These include such devices as high steam pressure shut-down, forced draft fan de-energizing relays, low water shut-down and fuel cut-outs. A three-way solenoid valve disconnects the manual control signal from the control system and directs the automatic signal to the induced draft fan damper if an attempt is made to fire the boiler while the fan is on manual. Purging before firing is automatic and all fuel lines are fully protected against low pressure.

Boiler water level is controlled by a Copes Type BI single response thermostatic tube actuated regulator. Operation is fully automatic, the expanding and contracting force of the sensitive but rugged tube being applied directly to control the regulating valve.

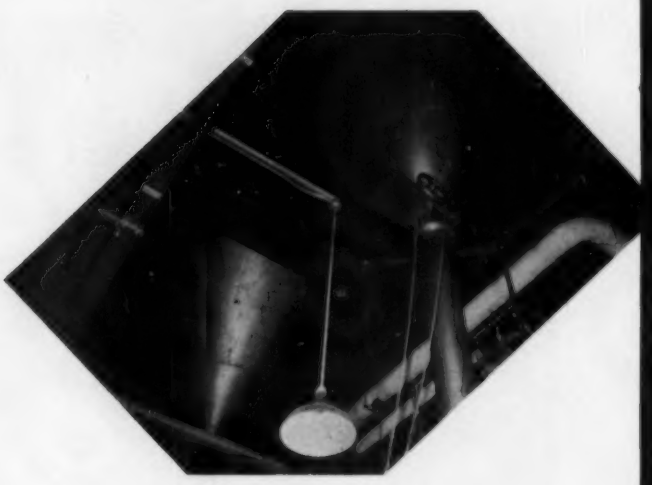
Each boiler is equipped with two burners, each of which is sized for 15,000 lb/hr. This sizing is reduced temporarily by using smaller holes in the gas rings to give a firing rate of 6,000 lb/hr for each burner, features that will be changed when the new load comes on.

The boilers have operated automatically during the past months on loads as low as 1500 lb/hr and, on semi-automatic conditions, have functioned successfully on loads down to minimum steam requirements. Performance of the boilers and control has met every expectation, and the heating plant layout is considered the number one exhibit at the hospital.

Boilers	Babcock & Wilcox
Combustion Control	Copes-Vulcan
Feedwater Regulators	Copes-Vulcan
Soot Blowers	Copes-Vulcan
Oil Burners	Babcock & Wilcox
Gas Burners	Babcock & Wilcox
Radial Brick Stack	Consolidated Chimney Co.
Forced Draft Fans	Buffalo Forge Co.
Boiler Feed Pumps	American-Marsh Pumps, Inc.
Condensate Pumps	American-Marsh Pumps, Inc.
Deaerator	Cochrane Corporation
Water Treatment (Zeolite)	Cochrane Corporation
Continuous Blow-Down	Cochrane Corporation
Fuel Oil Pumps	George D. Roper Co.
Hot Water Circulating Pumps	American-Marsh Pumps, Inc.
Air Compressors	Ingersoll-Rand
Domestic Water Heater	Richmond Engineering Co.
Storage Tanks	Richmond Engineering Co.

New finishing plant at Albemarle, N. C.

New Steam Plant



Coal bunkers located overhead in boiler house each hold two railroad carloads of coal and feed boilers fired by stokers.

THE NEW steam plant for the Collins and Aikman Corporation, Albemarle, N. C., houses two new coal fired Keeler boilers, each producing from 50,000 to 70,000 lb/hr. These boilers supply steam for heat and for plant operations. The company buys electrical power from a source nearby.

The boilers are equipped with Riley stokers which are fed by overhead storage bunkers (see illustration), each holding two freight car loads of coal. Overhead, underground, and surface storage is provided for ample coal handling convenience to the effective conveyor system.

The parent company was decentralized about two years ago, and the automotive division was set up separately. The Albemarle plant is actually the finishing operation for the automotive division which handles upholstery fabrics, carpeting, and decorative fabrics.

This new finishing plant contains 125,000 sq ft of floor space and is equipped to finish practically every kind of fabric. Capacity of the plant is 200,000 yards or more per week, depending upon the types of fabrics being processed.

New structure houses two new coal fired boilers, each producing 50,000 to 70,000 lb/hr for heating and operations requiring steam.

GOOD LIGHTING a Tool for Production

Part 7 - How Much Does Lighting Cost

By ROY A. PALMER
Duke Power Company, Charlotte, North Carolina

GOOD LIGHTING like good machinery, labor and other items required for production, costs money. Because lighting costs are quite intangible, it may be difficult for the plant manager to fully justify in his own mind the expense involved in providing this important tool for production.

It perhaps is only natural then, that attention is focused on the initial cost of fixtures, cost of new and replacement lamps and cost of electric current for operating the lighting system. Seldom, however, is time or effort taken to determine the actual annual cost per foot-candle of illumination on the working area.

It must always be remembered that we buy *illumination* and the cost of fixtures, lamps, electric current, lamp replacements, cleaning, depreciation, insurance, interest and taxes constitute the cost of that illumination. Too often it is assumed that lighting costs are represented only by the cost of lamps purchased or by the cost of electric current.

An increase in the efficiency of lamps lowers cost of light. Perhaps the main reason for the rapid acceptance of the fluorescent lamp since its development in 1938 is the fact that its light output per watt of electricity consumed was higher than the filament lamp and has steadily increased since that time.

A secondary reason, though equally important, is that its characteristics permitted the higher illumination levels which progress in the lighting art has constantly demanded.

This does not mean however, that the incandescent lamp is outmoded or obsolete. There are many lighting applications where the incandescent lamp can do a better job, or at less cost than a fluorescent lamp. Evidence that the incandescent lamp is not obsolete is the constant increase in sales of this lamp through the years. The sales curve has always been up and more incandescent lamps are sold today than ever before.

If we were to compare the cost of an incandescent lighting system with a fluorescent system providing the same level of illumination, we would find that the cost of the incandescent lamps and fixtures would be considerably lower. But the operating cost would be lower for the fluorescent lighting system. Obviously, the savings in operating cost would perhaps spread over only a few years to pay for the higher initial cost of the fluorescent equipment.

It may be difficult for an industrial executive to determine exact costs of lighting because of bookkeeping methods. Most likely the cost of current to operate the lamps is included in cost of power to operate machines. The cost of fixtures and wiring as well as labor for cleaning and relamping may be included in other capital and

13 FEATURE ARTICLES ON INDUSTRIAL LIGHTING

Part 1. Size Brightness Contrast	July, '57
Part 2. Requirement for Various Jobs	August, '57
Part 3. Planning Good Lighting	September, '57
Part 4. Fluorescent Lamps	November, '57
Part 5. Incandescent Lamps	December, '57
Part 6. Paint and Illumination	February, '57
Part 7. How Much Does Lighting Cost?	This Installment

COMING — Lighting for Safety . . . Special Applications . . . Protective Lighting . . . Industrial Offices . . . Wiring . . . Check List (How to Get the Most for Your Lighting Dollar).

TABLE I - COST ANALYSIS: INDUSTRIAL FLUORESCENT LIGHTING SYSTEMS FOR LOW MOUNTING

LIGHTING SYSTEMS		Slimline Instant Start 120-Volt, 8-ft Section 2 - 96T12 (Series)		Power Groove 120-Volt, 8-ft Section 2-96PG17 - (Est)		40-Watt Rapid Start 120-Volt, 8-ft Section 4-40-Watt T12/RS	
BASIC DATA							
1. Rated initial lamp lumens per luminaire (std. cool white)		10,100		26,000		10,600	
2. Group relamping interval (hours)		6,000		5,000		6,000	
3. Average watts per lamp		74		200		39	
4. Watts per luminaire (includes ballast watts)		174		480		188	
5. Coefficient of utilization (a)		.74		.72		.74	
6. Maintenance factor		.82		.73		.82	
7. Effective maintained lumens per luminaire (items 1x5x6)		6,140		13,680		6,440	
8. Relative number of luminaires needed for equal maintained ft-c		1.00		.449		.955	
INITIAL COSTS							
9. Net cost of one luminaire (estimated)		$44.00		$75.00		$45.50	
10. Installation and distribution system cost per luminaire (est.)		$34.00		$70.00		$39.00	
11. Net initial lamp cost per luminaire including tax (estimated)		$ 4.30		$ 8.45		$ 3.40	
12. Total initial cost per luminaire (Items 9+10+11)		$82.30		$153.45		$87.90	
13. Annual owning cost per luminaire (15% of items 9+10)		$11.70		$ 21.80		$12.70	
14. Relative initial cost for equal maintained footcandles (Items 12x8) for system compared / Item 12 for base system		1.00		.84		1.02	
ANNUAL OPERATING COSTS							
15. Burning hours per year		2500	4000	2500	4000	2500	4000
16. Annual energy cost (Items 4x15xrate in ¢ per kwhr / 100,000)	1 ¢ per kwhr	$4.35	$7.00	$12.00	$19.20	$4.70	$7.50
	2 ¢ per kwhr	$8.70	$14.00	$24.00	$38.40	$9.40	$15.00
17. Number of lamps replaced per year (Item 15xno. lamps per unit / Item 2)		.83	1.33	1.0	1.60	1.67	2.67
18. Lamp cost (Item 17xnet price per lamp including tax)		$1.80	$2.85	$4.20	$6.75	$1.40	$2.25
19. Labor cost for lamp replacements (b)		.35	.60	.45	.70	$ .75	$1.20
20. Cost of cleaning twice per year		$1.70	$1.70	$1.80	$1.80	$1.70	$1.70
21. Total annual operating cost per luminaire (Items 16+18+19+20)	1 ¢ per kwhr	$8.20	$12.15	$18.45	$28.45	$8.55	$12.65
	2 ¢ per kwhr	$12.55	$19.15	$30.45	$47.65	$13.25	$20.15
22. Relative annual operating cost for equal maintained footcandles (Items 21x8) for system compared / Item 21 for base system	1 ¢ per kwhr	1.00	1.00	1.01	1.05	.99	.99
	2 ¢ per kwhr	1.00	1.00	1.09	1.12	1.01	1.00
TOTAL ANNUAL COST							
23. Total annual cost per luminaire (Items 13+21)	1¢ per kwhr	$19.90	$23.85	$40.25	$50.25	$21.25	$25.35
	2¢ per kwhr	$24.25	$30.85	$52.25	$69.45	$25.95	$32.85
24. Relative total annual cost for equal maintained ft-c (Item 23) x (Item 8) for system compared / (Item 23) for base system	1¢ per kwhr	1.00	1.00	.91	.95	1.02	1.02
	2¢ per kwhr	1.00	1.00	.96	1.01	1.02	1.02
VISUAL COMFORT INDEX (c)		78		55 (Estimated)		78	

(a) For Room Ratio, 5.0 (A) 70% ceiling, 30% walls.

(b) Group Lamp Replacement Program — selected lamps used for interim replacements. Labor for these replacements is assumed to be $1.70 per lamp if starters are required; $1.50 per lamp if not. Group replacement labor assumed $.15 per lamp.

(c) Per cent of people who would be expected to appraise the lighting system as comfortable when seated at the middle of the rear wall looking horizontally — crosswise view of the lighting system. Initial appaisal for a 50 foot-candle installation maintained in a space 120′ x 160′ with luminaires mounted 14 feet from the floor.

operating costs. However, close estimates can be made which will give a very close approximation of illumination costs.

When a new lighting system is contemplated, a cost comparison between using various type lamps may be helpful in making a decision. A paper by A. C. Barr and C. L. Amick of General Electric Company, Nela Park, Cleveland, Ohio, entitled "Fundamentals of Lighting Cost Analysis" was presented at the National Technical Conference of the Illuminating Engineering Society in August 1951.

That paper showed fundamental cost elements by which different lighting systems can be compared. The procedure suggested by this paper is shown in Tables I, II and III with cost figures brought up to date by D. R. Phillips of Nela Park, Cleveland, Ohio.

When comparing one system with another, all costs should be equated to the same illumination level in service. Likewise, equal rates should be used for amortization of initial investment and allowing for interest, taxes and insurance. The burning hours per year should be equal. Since the life of fluorescent lamps is determined by the number of times they are turned on rather than the number of hours burned, the same frequency of starting should be used for each system. Similarly, the schedules for cleaning should be approximately the same. Labor rates for cost of installation, cleaning and relamping should be uniform.

Adherence to these suggestions will assure a fair comparison. By substituting actual figures for a specific installation in the proper column in these tables, the relative cost for different systems under consideration can be determined. The analysis is divided into four principal sections: (1) Basic Date, (2) Initial Costs, (3) Annual Operating Costs and (4) Total Annual Cost.

Basic Data

Basic data includes lamp and lighting design data. The figures shown for fluorescent lamps are for Standard Cool White Group lamp replacement, Item 2, means replacing all lamps at 80% of rated life (80% of 7500 hrs = 6000 hrs). Twenty per cent of the unblackened or otherwise not deteriorated lamps of those removed are saved for replacing spot burnouts during the next 6000 hours. This method saves labor costs in re-

TABLE II - COST ANALYSIS: INDUSTRIAL LIGHTING SYSTEMS FOR HIGH MOUNTING -FLUORESCENT AND FILAMENT

LIGHTING SYSTEMS		1-1000-watt PS-52 120 Volts Filament		Slimline Instant Start 120-Volt, 8-ft Section -- 2-96T12 (Series) Fluorescent	
BASIC DATA					
1. Rated Initial lamp lumens per luminaire(std.cool white)		23,000		10,100	
2. Lamp Life		1,000		7,500	
3. Average watts per lamp		1,000		74	
4. Watts per luminaire(includes ballast watts)		1,000		174	
5. Coefficient of Utilization (a)		.52		.45	
6. Maintenance factor		.70		.80	
7. Effective maintained lumens per luminaire (items 1x5x6)		9,090		3,635	
8. Relative number of luminaires needed for equal maintained fc		1.00		2.50	
INITIAL COSTS					
9. Net cost of one luminaire (estimated)		$10.00		$44.00	
10. Installation and distribution system cost per luminaire(estimated)		$94.80		$45.80	
11. Net initial lamp cost per luminaire including tax (estimated)		$ 1.95		$ 4.30	
12. Total initial cost per luminaire (Items 9+10+11)		106.75		$94.10	
13. Annual owning cost per luminaire (15% of Items 9+10)		$ 15.70		$13.45	
14. Relative initial cost for equal maintained footcandles (Items 12x8) for system compared / Item 12 for base system		1.00		2.20	
ANNUAL OPERATING COSTS					
		2500	4000	2500	4000
15. Burning hours per year					
16. Annual energy cost (Items 4x15x rate in ¢ per kwhr / 100,000)	1¢ per kwhr	$25.00	$40.00	$4.35	$6.95
	2¢ per kwhr	$50.00	$80.00	$8.70	$13.90
17. Number of lamps replaced per year(Item 15x no.lamps per unit) / Item 2		2.5	4.0	.67	1.07
18. Lamp cost (Item 17 x net price per lamp including tax)		$4.90	$7.80	$1.45	$2.30
19. Labor cost for lamp replacements (b)		$4.40	$7.00	$1.15	$1.90
20. Cost of cleaning twice per year		$1.20	$1.20	$2.00	$2.00
21. Total annual operating cost per luminaire (Items 16+18+19+20)	1¢ per kwhr	$35.50	$56.00	$8.95	$13.15
	2¢ per kwhr	$60.50	$96.00	$13.30	$20.10
22. Relative annual operating cost for equal maintained footcandles - (Items 21x8) for system compared / Item 21 for base system	1¢ per kwhr	1.00	1.00	.63	.59
	2¢ per kwhr	1.00	1.00	.55	.52
TOTAL ANNUAL COST					
23. Total annual cost per luminaire (Items 13+21)	1¢ per kwhr	$51.20	$71.70	$22.40	$26.60
	2¢ per kwhr	$76.20	$111.70	$26.75	$33.55
24. Relative total annual cost for equal maintained fc (Item 23) x (Item 8) for system compared / (Item 23) for base system	1¢ per kwhr	1.00	1.00	1.09	.93
	2¢ per kwhr	1.00	1.00	.88	.75
VISUAL COMFORT INDEX (c)		Probably less than 5%		88	

(a) For Room Ratio 1.25 (G), 50% ceiling, 30%.

(b) Labor assumed to be $1.75 per lamp.

(c) Per cent of people who would be expected to appraise the lighting system as comfortable when seated at the middle of the rear wall looking horizontally in a space 80' x 140' with luminaires mounted 44 feet high having a level of illumination of approximately 50 foot-candles.

placing lamps and assures full illumination valve at the work plane. Spot relamping instead of group replacement may increase cost up to 5%.

In Part 3 of this series published in the November 1957 issue of SPI, is outlined the method for calculating a lighting system. The phrase "Coefficient of Utilization" (Item 5 in accompanying tables) is the percentage of the light reaching the work plane after deducting the amount of light absorbed by the fixture (luminaire), the color of the walls and ceiling and the proportions of the room. Manufacturers' catalogs show the coefficients for each of their fixtures.

Reference to the November issue will help to clarify this further as well as the phrase "Maintenance Factor" (Item 6), which is a figure based on average lumen lamp output through life, depreciation of illumination due to dirt and dust collection on lamps and luminaries and darkening of walls and ceilings.

In Item 8 the figures are multiplying factors that equate the various systems to a common illumination valve. Similarly, factors shown in the other sections provide relative initial, operating, and total annual cost.

Initial Costs

Initial costs include the net costs of procuring and installing the different systems. The local contractors or plant electrician can supply estimated average cost of installation per luminaire. The various types of lamps will of course vary because fluorescent lamps may be placed in continuous rows while incandescent and mercury lamps will be hung individually.

Wiring costs should be included in these figures, but care should be used to differentiate between wiring used solely for lighting and wiring for power.

The lamp originally installed when the installation is new (Item 11) is considered part of the initial cost. Lamps used later for replacement are charged as operating expense (Item 18).

Like other items in the plant, the lighting system should be depreciated. Usually it is amortized in 10 years at 10% per year, plus 5% for interest, insurance and taxes. The lamp cost is not written off since the life of a lamp automatically dictates its depreciation. The local plant's accounting procedure may vary the suggested amortization percentage given above.

Operating Costs

Annual operating costs include electric energy, lamp replacements, cleaning materials and equipment as well as labor for cleaning and lamp replacement. The exact rate for energy and the number of hours which the lighting system can usually be determined in each plant. For convenience in these tables, the rates 1c and 2c per kwh are given and operating hours 2500 and 4000 per year are used which is typical for one- and two-shaft operation respectively.

Total Annual Cost

Total annual cost is the figure

TABLE XII - COST ANALYSIS: INDUSTRIAL LIGHTING SYSTEMS FOR HIGH MOUNTING - MODIFIED - COLOR MERCURY LAMPS

LIGHTING SYSTEMS		1-1000-watt PS-52 120 Volts Filament		2-H400-BC1 Aluminum Open Top 240 Volts Mercury	
BASIC DATA					
1. Rated initial lamp lumens per luminaire (std.cool white)		23,000		41,000	
2. Lamp Life		1,000		6,000	
3. Average watts per lamp		1,000		400	
4. Watts per luminaire (includes ballast watts)		1,000		860	
5. Coefficient of Utilization (a)		.52		.59	
6. Maintenance factor		.76		.76	
7. Effective maintained lumens per luminaire (items 1x5x6)		9,090		18,400	
8. Relative number of luminaires needed for equal maintained fc.		1.00		.494	
INITIAL COSTS					
9. Net cost of one luminaire(estimated)		$10.00		$95.00	
10. Installation and distribution system cost per luminaire (estimated)		$94.80		$135.50	
11. Net initial lamp cost per luminaire including tax (estimated)		$ 1.95		$ 33.20	
12. Total initial cost per luminaire (Items 9+10+11)		$106.75		$263.70	
13. Annual owning cost per luminaire (15% of Items 9+10)		$ 15.70		$ 34.60	
14. Relative initial cost for equal maintained footcandles (Items 12x8) for system compared / Item 12 for base system		1.00		1.22	
ANNUAL OPERATING COSTS					
15. Burning hours per year		2500	4000	2500	4000
16. Annual energy cost (Items 4x15x rate in ¢ per kwhr) / 100,000	1¢ per kwhr	$25.00	$40.00	$21.50	$34.40
	2¢ per kwhr	$50.00	$80.00	$43.00	$68.80
17. Number of lamps replaced per year (Item 15x No.lamps per unit) / Item 2		2.5	4.0	.83	1.33
18. Lamp cost(Item 17 x net price per lamp including tax)		$4.90	$7.80	$13.80	$22.15
19. Labor cost for lamp replacements (b)		$4.40	$7.00	$ 1.45	$ 2.35
20. Cost of cleaning twice per year		$1.20	$1.20	$ 1.70	$ 1.70
21. Total annual operating cost per luminaire (Items 16+18+19+20)	1¢ per kwhr	$35.50	$56.00	$38.45	$60.60
	2¢ per kwhr	$60.50	$96.00	$59.95	$95.00
22. Relative annual operating cost for equal maintained footcandles (Items 21x8) for system compared / Item 21 for base system	1¢ per kwhr	1.00	1.00	.54	.54
	2¢ per kwhr	1.00	1.00	.49	.49
TOTAL ANNUAL COST					
23. Total annual cost per luminaire(Items 13+21)	1¢ per kwhr	$51.20	$71.70	$73.05	$95.20
	2¢ per kwhr	$76.20	$111.70	$94.55	$129.60
24. Relative total annual cost for equal maintained fc (Item 23) x (Item 8) for system compared / (Item 23) for base system	1¢ per kwhr	1.00	1.00	.70	.66
	2¢ per kwhr	1.00	1.00	.61	.58
VISUAL COMFORT INDEX (c)		Probably less than 5%		90	

(a) For Room Ratio 1.25 (G), 50% ceiling, 30% walls.

(b) Labor assumed to be $1.75 per lamp.

(c) Per cent of people who would be expected to appraise the lighting system as comfortable when seated at the middle of the rear wall looking horizontally in a space 80' x 140' with luminaires mounted 44 feet high having a level of illumination of approximately 50 foot-candles.

which tells the story which we ultimately seek after substituting the specific plant's own figures. Many facts can now be determined.

When planning a new lighting system the number of luminaires required for a given number of foot-candles of illumination can be determined as well as their spacing. Divide the effective maintained lumens per luminaire (Item 7) by the foot-candle level desired in service. The result is the number of square feet of lighted area per luminaire. This value determines the spacing of the luminaires, and, knowing the square feet in the plant, the total number of luminaires can be found. It may result in a fractional quantity which may mean slightly more or fewer units in order to achieve the desirable layout and proper appearance of the lighted room.

To obtain the initial cost in dollars, multiply Item 12 by the number of luminaires. To get the annual owning cost, multiply Item 13 by the number of luminaires. The annual operating cost can be found by multiplying Item 21 by the number of luminaires. The total cost can be determined by adding the results found in the initial cost and the operating cost. One should not forget to take into consideration the addition or deletion of luminaires due to fractional quantity resulting when calculating the square feet per luminaire.

How to Calculate Cost per Square Foot

The costs per square foot for various lighting levels can be easily determined. Dividing the dollar figure in Item 23 by the maintained lumens per luminaire on the work surface (Item 7) gives the cost per square foot for one foot-candle. This figure multiplied by the desired lighting level will give the costs per square foot for that lighting level.

For example, for the Slimline Instant Start Lamp in Column I, Table I, the annual cost per square foot for 100 foot-candles will be:

$$\frac{23.85 \times 100}{6140} = \$.388 \text{ per sq ft}$$

For the new Power-Groove Lamp in Column II:

$$\frac{50.25 \times 100}{13,680} = \$.367 \text{ per sq ft}$$

The cost per square foot for the same foot-candle level is usually lower when a high-efficiency lamp is used.

It is difficult to cover analyses for all of the various lamps used in industry in the space allotted. Therefore, the more popular types and the new power-groove lamps at both low and high mounting heights are shown here. Data for other lamps are available.

Comprehensive and accurate cost analysis of the lighting system is necessary to show where the lighting dollar goes. Good lighting is a most important tool in production. Accurate cost data will help to avoid wasting money and still provide the adequate lighting, which is so essential in economical industrial operations.

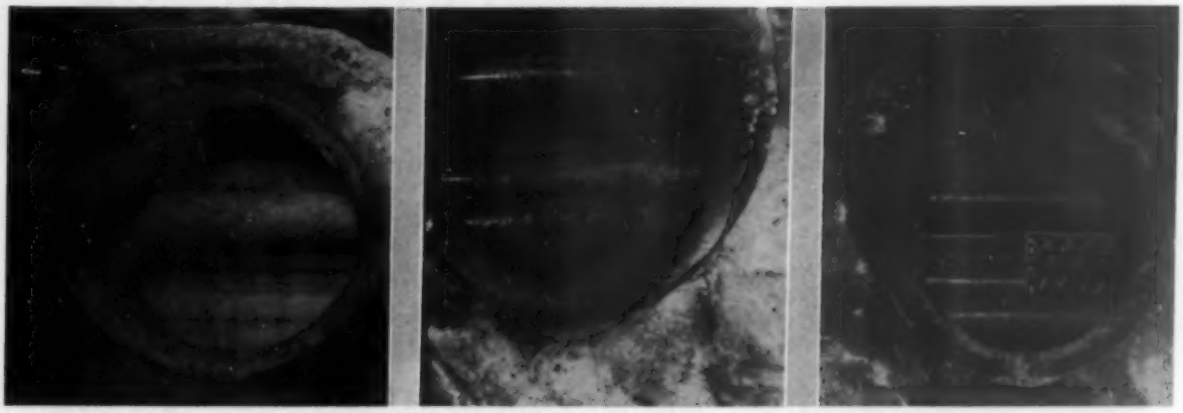


Photo at left shows scaled condition of boiler at start of cleaning. Center photo shows condition immediately after cleaning. Right photo was taken a year later and shows that treatment keeps the boiler clean.

Chemical Cleaning for Small Boilers

AN EXAMPLE of the value of chemical cleaning and proper feedwater treatment is found at Knoxville By-Products, Inc., Strawberry Plains, Tennessee. The heat exchange surface of this 150 hp Cyclotherm boiler was found coated with approximately ¼" of scale containing a high percentage of iron oxide.

The scaled condition of the boiler is shown in photo No. 1. A boiler "compound" had been used as feedwater treatment during the time when this scale deposit was formed. Laboratory analysis of this calcium carbonate scale deposit indicated that no preboil would be necessary and the entire chemical cleaning operation was completed in less than 30 hours with 100% of the scale deposits removed.

The condition of the boiler after cleaning is shown in photo No. 2. Note the pitting in the boiler tubes resulting from oxygen corrosion.

A careful analysis of this boiler operation was made and the proper feedwater treatment program inaugurated. Make-up water is secured from a nearby creek which contains from 150 to 190 ppm hardness. In addition, the problem of considerable fluctuation in water conditions, such as silt, etc., had to be considered. At the end of one year of proper treatment, this boiler (as shown in photo No. 3) is completely free of scale and corrosion.

Before the chemical cleaning, this boiler was unable to meet the load requirements of the plant. Upon completion of the chemical cleaning operation, the load demands were met with no difficulty. No figures on fuel savings are available since during the past year this plant operation has expanded to where a second boiler of the same size has been installed. With proper feedwater treatment, this new boiler is also completely free of scale and corrosion after six months of operation.

By STEVE CASSELL, Water Services, Inc., Knoxville, Tenn.

Baffle Protects Motor

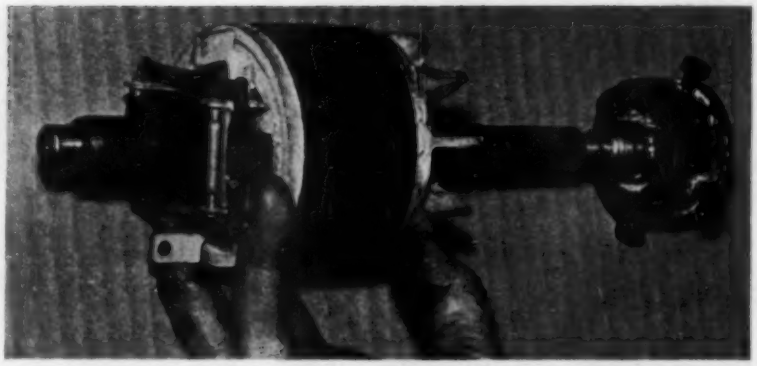
ON AN OUTDOOR pump mounting, at some distance from the main building of a plant, there was a possibility that high-pressure liquid might work past the pump shaft packing and enter the windings of the motor.

To guard against this possible damage, a baffle was erected on the concrete base supporting both pump and motor, and a secondary seal effected by placing a packing gland around the motor shaft at the point it pierced the baffle.

The shield protects the motor against any possible leakage from the pump, extending both high and wide enough to divert any spray or stream which might emerge at a sharp angle from the shaft.

By ELTON STERRETT
Houston, Texas

Simplified Centering



MANY of our pump motor shafts are threaded on one end to hold the impeller, and have no center at this end. When the shafts require removal for straightening or machining, a machinist must spend time centering the blind shaft.

We avoid this detail with a steel forging which is tapped at four equi-distant points to take four machine bolts. It has a hardened center in its back, and an internal thread which fits the threaded end of the shaft.

The forging is screwed onto the threaded end of the bent shaft. It is simply slipped over the other end of the shaft, if the machine work is to be performed there, and the four machine bolts are adjusted until the shaft runs true for the machining operation.

Thus it isn't necessary to waste time centering the blind end.

By HARRY J. MILLER
Sarasota, Florida

Combination Connectors Save Space & Ease Installation in Fla. Plant

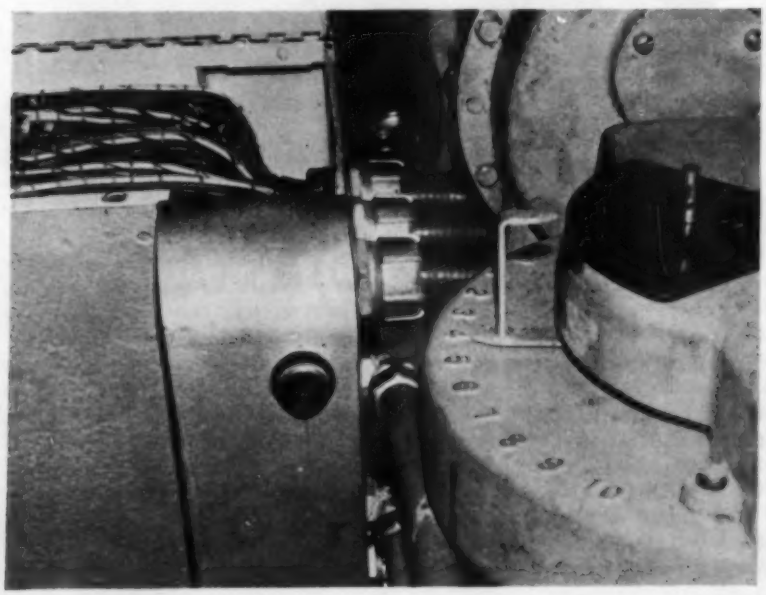
ELECTRICAL codes called for liquid-tight connectors properly insulated, gasketed and grounded for terminating liquid-tight flexible metal conduit at cabinets, junction boxes and pull boxes. Standard connectors, which do not have adequate threads to accommodate a gasket assembly, box wall thickness, a locknut and an insulated bushing, would have required additional installation time and labor and taken space in the boxes needed for conductors.

Equipment involved were heavy presses at the Miami News, Florida. Press operation would cause severe vibration along raceways, shaking conductors and making insulating bushing protection for conductor insulation especially necessary.

Use of liquid-tight connectors with integral insulated throats, a combination fitting by The Thomas & Betts Co., filled code requirements and eliminated the installation and space problems. The built-in insulation saved on the extra time and effort spent to handle and install separate bushings which standard liquid-tight connectors require.

Space was at a premium in the boxes because each was crowded with many small control cables. The separate bushings of the standard fittings would have taken space all around the connector, overlapping in some cases on other knock-outs of the box. The built-in bushing, lining the throat and edges of the connector, occupied no space in the boxes.

The liquid-tight connector with the built-in insulated throat includes a steel grounding cone and a Zytel sealing gland, exactly like uninsulated liquid-tight flexible conduit connectors. Besides sealing tightly, the Zytel gland also protects the raceway's plastic jacket.

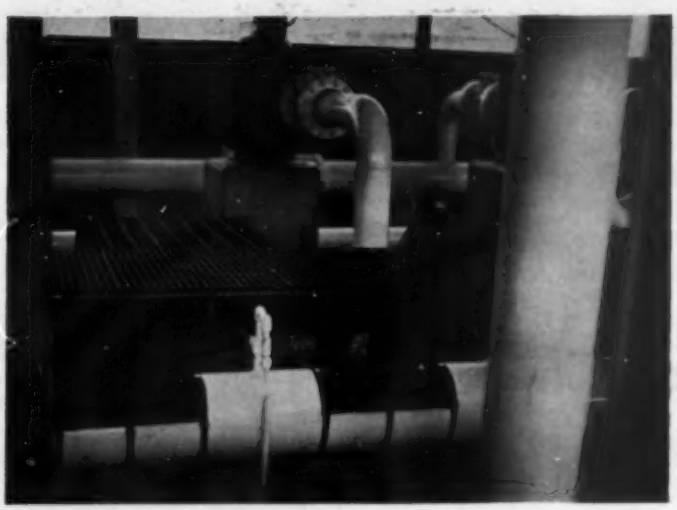


Flexible liquid-tight conduit snake through tension switches into control terminal cabinet. Vibration from nearby equipment causes conductors to shake against walls of the conduit, but built-in insulated throats of the liquid-tight connectors protect conductor insulation at termination points.

HEATING PLANTS — Guide Specifications for Typical Low-Pressure Commercial Plants

Bituminous Coal Institute's first Guide Specifications written for a typical low-pressure commercial heating plant consisting of two 500 lb/hr screw-type underfeed stokers has been recently published. The 53-page manual is to be a guide for consulting engineers and architects and others, in the writing of specifications for coal-fired heating plants. Specifications are written specifically for a design heating load of 20,000 EDR or 4.8 million Btu/hr. By adjusting boiler, stoker and bin size up or down, the basic recommendations on layout and type of equipment can be used for most heating plants of a load range of 3,000 to 24,000 EDR or about ¾ to 5½ million Btu/hr.

Recommendations have been made to achieve clean, efficient and low cost plant operation consistent with low initial cost. All items affected by the fuel selected are described in detail, but all other items required for a complete heating plant have been listed in the Specification Index. For your free copy write: Bituminous Coal Institute, Southern Bldg., 15th & H Sts., N.W., Washington 5, D. C., and ask for "Guide Specifications"—AIA No. 30-A.



Rubber Mats Protect Pipe Surface

STEPS at each end of the walkway along a battery of meters did not offer the shortest route to the drain valves on the strainers in the lines ahead of the meters — it being more convenient to step down onto the pipeline serving the meters than to go around. This practice was unsafe and unsightly — unsafe because the round pipe did not offer good footing, and unsightly because mud on shoes marked the white pipe.

To avoid both these difficulties, two rubber mats, of the type made for placing atop the usual automobile floor mat, were attached to the pipe with 1-in. steel strapping. The rubber protects the pipe against dirt, and the corrugated surface offers safe footing. Presence of pads at two convenient points tends to cut down random walking across the pipeline where it is not equipped with the treads.

By ELTON STERRETT, Houston, Texas

Light Bulb Changer

THANKS to a design idea of Joe H. DeLany, foreman, electrical maintenance, at Lockheed's Georgia Division, burned out bulbs can now be replaced without the serviceman carrying a ladder. As a matter of fact, he now brings the light to the floor for service, instead of his going to the light.

Construction is simple and rugged. An aluminum rod extends through a section of ¾ inch EMT conduit. At the lower end of the rod a quick acting lever actuates vise-like jaws at the upper end which grip the light fixture and enable the user to twist the fixture free for removal. Jaws which grip the fixture are padded with rubber to prevent scratches.

To replace the fixture, the operator simply sets it in the device, fits it to the union in the ceiling and with a twist of the wrist, it is reconnected.

Cylinder Repaired

THESE PHOTOS show how a cracked air compressor was repaired. All paint, dirt and grease on the damaged cast iron surfaces were carefully cleaned and the crack was groved.

A carburizing oxy-acetylene flame was used for melting a specially developed "Eutectic" flux which was painted on the joint area. When bonding temperature was reached the EutecRod 15 was applied to the fractured area until the entire surface had been bonded. This insured a complete interfacial bond before the build-up was made.

Then a ¼" shelf was built-up about 1⅛" below the crack. Successive layers were added by using the torch directly on the rod until a thick layer was tightly bonded to the surface and flowed into and across the crack to make a perfect seal. All work was done in position. At no time was 600 F temperature exceeded during repair operation.

After finishing operation, joint successfully passed 60 pound water pressure test, without any leakage or seepage.

Technical data and photos courtesy of Eutectic Welding Alloys Corporation.

In Maryland plant . . .

Fine Finish Grinding Gives Longer Lasting Cutting Edge

AS A RESULT of going back to school, Frank Robinson, General Foreman of the Hampstead, Maryland, plant of the Black & Decker Manufacturing Company, devised a resharpening technique which has increased the edge life of their carbide boring tools as much as ten times.

The "school" was the customer grinding course given regularly by Norton Company, Worcester, Mass., abrasive manufacturers. In one of the class sessions devoted to better tool grinding, it was brought out that tool life could be increased by using a finer grit (220 or 320) diamond wheel for the finish grind on carbide tools.

The principle behind this recommendation is that finer abrasive produces a stronger edge. Viewing a tool edge under strong enough magnification will show the fine serrations left by the abrasive. When two ground surfaces meet at an edge, the result is a somewhat uneven line. In a tool, this uneven line is the cutting edge. The higher portions will wear first. The nearer straight this edge is, the more even and cooler will be the cutting action, hence the stronger edge and longer life.

Increased Tool Life

If a finer grit produces a better edge, reasoned Mr. Robinson, why not try a very fine wheel? On returning to his own plant, he assembled a special grinding attachment mounting a 1500 S grit Norton diamond wheel (wheel specification, D1500S-L25B 1/16", Type D9WH). Laboratory tests on tools finish ground with the fine wheel produced some startling results. Single point carbide tools used in boring machine lasted four, five and in some cases ten times as long as tools sharpened by previous methods.

The material being machined is die cast aluminum. This accounts, in part, for the greatly improved tool life. Unless the tool is ground to a low micro-inch finish, aluminum tends to "stick" to the tool, thereby reducing its life. This tendency is not as marked with other common metals. Prior to using the fine grit wheel, Black & Decker had been getting about a 15 micro-inch finish on the tool faces that form the cutting edge

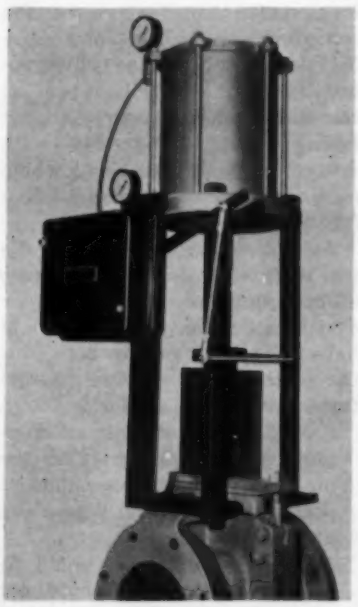
(an average finish for metal working tools). The fine grit wheel produced a 5 to 7 micro-inch finish.

At Black & Decker's 480,000 sq ft Hampstead plant, approximately 1750 carbide edge tools come into the tool crib for sharpening each month. Increased tool life has meant substantial savings.

Stock Tank Level Control

THE CONTROL of the critical stock tank level in their bleach room was becoming a serious problem to a Maryland pulp and paper company. The 8-in. piston operated gate valves were operating improperly due to positioner trouble. Some valves were requiring maintenance as frequently as twice a week.

When the given stock tank level is not maintained, the hydraulic heads on the stock pumps vary. This causes the stock passing the bleaching section to vary and the final product is unevenly bleached.



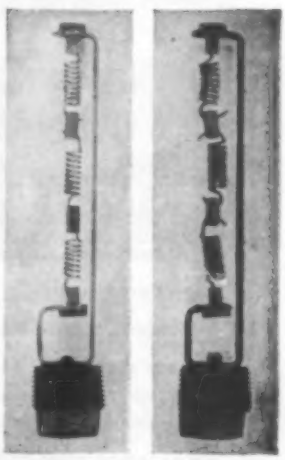
The problem was solved by replacing the positioners with Bailey Meter Company Positioning Relays. These relays have not only caused the valves to operate properly, but have required no maintenance whatever since they were installed.

BIRD-ARCHER Amine Treatment
INSURES LONGER LIFE FOR PIPE

Return line corrosion is one of the most critical problems in maintaining economical, efficient power plant operation.

Bird-Archer Amine Treatment is an easy, effective and economical way to eliminate corrosion troubles. Amines raise the pH value of the return condensate to the point whereby the corrosion potential is negative. In addition, amines provide a surface protection for the metal itself which further inhibits corrosion. In scores of plants, Bird-Archer Amine Treatment is paying a profit on its cost through savings in piping replacement and maintenance work.

To demonstrate what corrosion can do in steam and condensate return lines, we show here "before" and "after" unretouched photographs of NDHA Corrosion Testers. This is a test* developed by the American Society for Testing Materials in cooperation with the National District Heating Association. Bird-Archer supplies and analyzes these testers. Photo at left shows a Tester before installation. Photo at right shows a Tester after it had been installed for 60 days in the return line. (*Standard Method of Corrosivity Test of Industrial Water, NDHA Method, ASTM Designation 935-49.)



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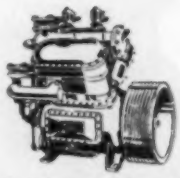
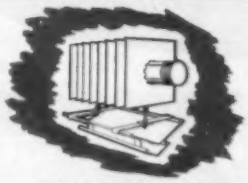
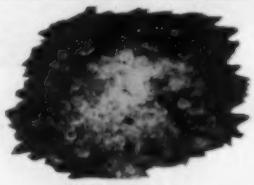


ECLIPSE COMPRESSORS

HEAVY-DUTY COMPRESSORS



PREST FIN PIPE COILS



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Oil Mist Lubrication

SOON after installation it became apparent that the lubrication system on our drum sanders here at Mississippi Products very definitely needed improvement. Force feed lubrication to the five main supporting bars upon which the feed bed slats traveled was inadequate from the standpoint of getting a desirable amount of oil to each of the five rails.

Adjustments on the lubricators could be made so that we would get too much oil on some rails thus ruining our stock being sanded as well as the rubbers on the feed bed chain; or we would get insufficient oil on some of the rails causing excessive wear and thus high maintenance costs. Also this was the result of stopped up grooves or oil lines due to dust from the normal sanding operation.

The Alemite Company introduced "Oil Mist Lubrication" involving a solonoid air valve which is operated by a coil in the control circuit of the motor driving the feed bed chain. Incorporated in this likewise is an oil reservoir and necessary copper tubing or pipe, together with proper spray nozzles, all of which composed what is termed *Oil Mist Lubrication.*

An examination and also the use of this same device on some other equipment, brought to our attention the fact that we would have several advantages here over the existing lubrication system furnished on the sander:

First, less possibility of stoppage due to the fact that the air used would create sufficient pressure to keep the lines clean at all times.

Second, the nozzles could be located so that we would not have to rely upon open ports over which the slats moved in order to pick up the oil. Here again, of course, this is a matter of stoppage which was, incidentally, our most severe trouble.

Third, by the use of the solonoid air valve, actuated by

the control circuit of the motor starter, oil would be turned off and on automatically as the chain would run.

One unit was purchased and a small pipe header was made up, one-half inch in diameter and long enough to extend across all five bed rails. At appropriate points, this header was drilled and tapped for the small nozzles specifically designed for this particular type of lubrication.

An actual oil mist spray is developed at the opening of each nozzle. These nozzles are so arranged and directed that the oil mist spray strikes the slats at the five points where they come in contact with the bed rails, just prior to their coming into contact with these same rails. Thus we are able to supply a thin oil mist coating to the actual slats at the points where it is needed.

The first unit was installed approximately three years ago with the result that we have decreased our wear on both the bed rails and the slats considerably. We have liked the arrangement so well that our second machine has now been equipped in a like manner.

We now have no trouble with stopped up oil lines and we find that we can get much closer adjustment of the proper amount of oil. This is extremely important to us because over-oiling would ruin our stock and under-oiling, of course, increases maintenance.

By G. H. ROBINSON, Plant Engineer, Mississippi Products, Inc., Jackson, Miss.

Lamp Tests Rectifiers

WE USE a considerable amount of electronic control equipment in our plant, and it is imperative to know that the numerous selenium rectifiers are operating at their rated output. This means continuous checking, and some fast method of testing.

For this we've arranged a simple system that involves hooking up the rectifiers to the alternating current line, in series with a double-electrode neon bulb. This

Tiny currents guard boiler safety!

Reliance electrode-type Levalarms®

1 operate alarms
2 actuate fuel cut-out
3 start and stop pumps

For extra safety, guard your boiler water levels with audible and visible alarms that reach operators anywhere in the plant. Or cut fuel automatically, without depending on human action. Here's more protection for boilers working on any pressure to 2500 lbs.

Levalarms operate on isolated electric currents passing through the boiler water itself. When water level gets too high or too low, circuits are made or broken and actuate relays *instantly* to cause ACTION (1, 2, or 3 above).

Four models of Levalarms installed on or in your water columns, provide a selection for various control combinations. Levalarms have no bellows or stuffing boxes; no vacuum tubes or magnets. Action is positive, immediate. Levalarms are unaffected by pressure, temperature or water conditions.

Read the full story of Reliance electrode-type Levalarms in Bulletin D2 sent on request.

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The name that introduced safety water columns....in 1884

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BOILER SAFETY DEVICES

For more information, use Reply Card—Page 81

DURALOY

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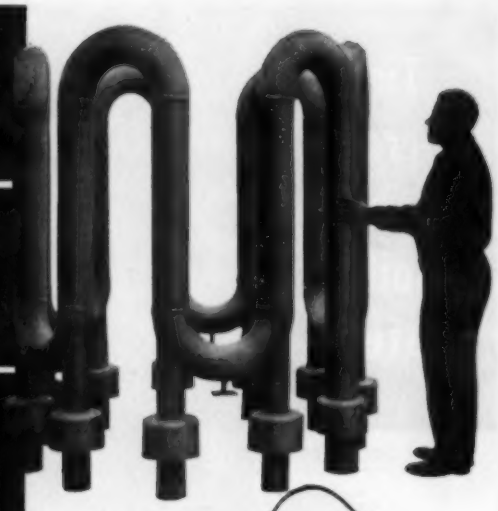

An Example of Duraloy TRIPLE Service

DURASHEL

This photograph of an 'immersion type radiant heater' shows a welded assembly of:

1—static castings (collars)
2—centrifugal castings (straight pipe sections)
3—shell molded castings (bends)

This unit provides an excellent example of our broad TRIPLE Service.

Our experience in static high alloy castings began in 1922; in centrifugal castings, in 1933; in shell molded castings, in 1955. Thus, in this radiant heater, the old blends with the new. It's an excellent example of the kind of work we do.

If you want your high alloy castings alloyed by specifically experienced metallurgists and cast by specifically experienced foundry men . . . those who work exclusively along these lines . . . Duraloy should be your choice.

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CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

circuit prevents damage to rectifier or bulb, regardless of the rectifier's condition.

The glow of the lamp bulb is a positive indicator of the condition of the rectifier. If it is open-circuited, no current can flow in either direction, thus the neon bulb will remain dark.

If the rectifier is shorted out, both plates of the bulb will glow, and when the rectifier is okay, a-c from the supply line is converted to d-c in which case only one plate of the neon bulb will light. On the other hand, a blinking light indicates an intermittent short or open in the rectifier. A pair of small alligator clips are used to connect the selenium rectifier, after which the power line is plugged in. After testing, unplug line before unclipping rectifier. Power supply is 117-volt.

By H. JOSEPHS

Just Look Inside

INSTRUMENTS with which doctors peer deeply into patients' bodies now have been adapted by industry to probe for defects hidden in complicated machinery.

Today industry's new tool, the borescope, is being used to examine carefully the insides of airplane propeller blades, boiler tubes, engine cylinders and hundreds of other structures — even rubber dolls — according to the manufacturer of the "borescope."

The long, needle-like instrument — in effect a periscope with a built-in flashlight — also enables atomic engineers to read gauges inside reactors from a safe distance.

The ingenious device can be inserted through openings as small as one-tenth of an inch in diameter to view surfaces up to 20 feet away.

Detecting cracks and faults in the inner walls of engine cylinders and valve seats which might cause trouble is a typical example of the use of borescopes. Time-consuming disassembly of engines purely for inspection is virtually eliminated, since the borescopes can be inserted quickly through spark-plug openings.

The condition of welds in closed spaces also can be quickly and accurately checked.

The medical instruments on which borescopes are based have various names such as cystoscopes for looking into bladders, nasopharyngoscopes for nose and throat work and hysteroscopes for the womb. In industry, however, they're all called borescopes regardless of the special application of the instrument.

The borescope is a long tube with a tiny incandescent lamp and an objective lens in one end, and an eyepiece with ocular lens and erecting prism in the other. Through the length of the tube, which may be only nine one-hundredths of an inch in diameter, are achromatic intermediate lenses, plus wiring for the lamp.

National Electric Equipment Co., which has manufactured such instruments for both the medical profession and industry for years, has developed a special lens system for them called the "Fontar." All objects and areas within view are always in focus, regardless of their distance from the instrument.

New Cycle Gas Turbine

(*Starts Page* 46)

h-p vertical feedwater heaters. From the heaters the feedwater will go directly to the boiler.

Drains from the h-p heater will automatically cascade back to the i-h-p heater, and the combined drains from that heater will flow back to the deaerator. Drains from the l-p heater will return to the condenser, as in the other operating cycle.

Make-up from either operating cycle will be supplied from a demineralizing water-treatment plant. Station drips and drainage will also supply a percentage of the make-up water.

The plant will be an entirely outdoor design. All of the components are conventional pieces of equipment proved in operation; only the arrangement and heat cycle are unproved in operation.

MEASURED COAL MEANS FUEL CONTROL
JAM-PROOF BELT FEEDER has brake-equipped motor, delivers exact, shallow stream of coal for uniform "break-away," insuring high accuracy. Feeder available with endless belt.

Conforms to U. S. Weights and Measures H-44 for your protection.

Richardson H-39
AUTOMATIC COAL SCALE
Built for worry-free performance—year after year!

At coal-fired installations the world over, dependable Richardson Automatic Coal Scales are a standard method of checking boiler efficiency and fuel economy.

The H-39 is available in two sizes: a 200-pound model, with hourly capacity of 20 tons, and a 500-pound model, with an hourly capacity of 40 tons.

Consider these advantages:

- **COAL CAN'T "ARCH"** in feeder or weighing hopper. All Richardson H-39 models have extra-large (24"x24") inlets for free movement under *all* conditions.
- **NO DUST PROBLEMS**—all parts positively dust-sealed. All electrical equipment is totally enclosed, mounted *outside* dustproof housing.
- **MINIMIZED CONDENSATION PROBLEM**—exhaust vents at each end for natural or forced air circulation.
- **EASY ACCESS** through doors mounted in removable plates.
- **RUGGED, DURABLE CONSTRUCTION** means *lasting* accuracy. Extra heavy steel frames, corrosion-resistant stainless plating.

For detailed information, write for Bulletin 0352-A.

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NEW Catalogs & Bulletins

STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

1—Package Boiler — New compact, low cost package unit (oil or gas fired) for small space requirements is described in Bulletin DK-1. Pressures to 325 psi, steam capacities to 45,000 lb/hr.—E. KEELER CO.

9—Free Coal Counseling — General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose.—NORFOLK AND WESTERN RAILWAY.

14—Generator Installations — Bulletin GB-1 shows how installations of Amesteam Generators have solved boiler room problems for their owners. Photos illustrate units from 10 through 600 hp for firing combinations of oils and gases. — AMES IRON WORKS, INC.

15—Packaged Steam Generators — Bulletin PSG-2 describes factory assembled portable type units from 10,000 lb/hr to 40,000 lb/hr capacities. Gives construction details and dimensions. In standard pressures of 175,250 and 375 P.S.I. gauge. — HENRY VOGT MACHINE CO.

16 — Small Boiler Performance — Brochure shows how the packaged Ljungstrom air preheater boosts performance. Boilers as small as 25,000 lb/hr can have advantages of regenerative preheating—saves fuel, boosts output, and permits use of lower grade fuels.—THE AIR PREHEATER CORPORATION.

19—Feed Water Deoxygenation—12 page Bulletin BW-7 describes advantages of chemical deoxygenation of boiler feed water with an aqueous solution of Hydrazine. Covers in detail the properties and action of Hydrazine in maintaining boilers as well as recommended methods of application. — FAIRMOUNT CHEMICAL CO., INC.

33 — Wall Deslagger — Design & operational features of furnace wall deslaggers discussed in Bulletin 1034.—COPES-VULCAN DIVISION.

40—Coal for Heating & Cooling — 16 page brochure describes boiler plant for heating and cooling the Hillside, Ill. Shopping Center. Drawings show the boilers and coal and ash-handling equipment. — BITUMINOUS COAL INSTITUTE.

60—Standardized Generators — Pre-engineered units, available for oil or gas firing, in capacities from 50,000 to 150,000 lb/hr for pressures to 1500 psi and superheated steam temperatures to 950 F, described in Bulletin B-55-4.—FOSTER WHEELER.

70—Seamless Boiler Tubes—44 page Bulletin 12 contains complete description of manufacture, advantages, tolerances, allowable stress and working pressures, bursting strength, weights, steam properties and other data.—National Tube Div., UNITED STATES STEEL CORP.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

102—Teflon Gear Pump — Bulletin describes self-priming rotary gear pump suitable for non-lubricating and corrosive fluids. Suitable for speeds to 1750 rpm at capacities to 10 gpm & pressures to 100 psi. — ECO ENGINEERING CO.

116—Air & Gas Compressors—Form 3132-A shows complete range of centrifugal and reciprocating units in process and chemical industries — for all pressures from deep vacuum up to 35,000 psi and capacities up to 165,000 cfm.—INGERSOLL-RAND COMPANY.

118—Rotary Pumps — Catalog 955, 8 pages — Describes and illustrates complete line of Roper Rotary Pump products. Sizes range from ¾ to 600 gpm for pressures up to 1000 psi. Has listing of materials of construction, performance data and dimensions. — ROPER HYDRAULICS, INC.

123 — Slurry Pump — Catalog describes the new SP-90 slurry pump which permits proportion of slurries in the mix tank to remain constant, with pumping rates variable from maximum to 1/5 of maximum.—MANZEL.

132—Glassed Centrifugal Pumps — 12 page Bulletin 725.2 describes line of glassed pumps for handling corrosive acids and alkalies. Every part of pump exposed to liquid has a tough glass surface. Specification, ratings, dimensions. — GOULDS PUMPS, INC.

147—Strainers — Bulletin 400 describes "Ezy-Kleen" line featuring removable clean-out baskets. Offer low pressure drop protection (head of pump) from undesirable substances in pumpage. — BLACKMER PUMP COMPANY.

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192—Induced Draft Fans — Catalog 905 describes the new Type DN Dynacurve fans offering minimum floor space & height requirements, and high efficiency over wide performance range. — CLARAGE FAN COMPANY.

INSTRUMENTS—METERS CONTROLS—REGULATORS

204—Floatless Level Control — Data sheets PC-37 describe control that is unaffected by surface agitation and equipment vibration. Simple, compact, one adjustment unit.—LESLIE CO.

223—Combustion Control — Bulletin 1023, 24 pages—Contains actual installation photos and diagrammatics of Bailey air operated combustion control for oil and gas fired boilers; two pages of chart records and six page list of typical installations. — BAILEY METER COMPANY.

225—Cooling Controls — Self-powered controls for compressors, stills, solvent coolers, degreasers, small engines, etc., described in Bulletin 710; operational and hook-up sketches.—SARCO COMPANY INC.

226—Duplex Transfer Valve—Bulletin contains design and performance information on the new Type 45 Duplex Transfer Valve and lists available sizes. — A. W. CASH CO.

228—Fuel Cut-Outs & Water Level Alarms — Brochure D2 — Electrode type equipment for installation on water columns to provide fuel cut-out, high and low water level alarms and pump cut on and off. For pressures to 2500 psi. — RELIANCE GAUGE COLUMN CO.

235—Liquid Levels — Bulletin 532 describes indicator which gives a reliable, automatic reading of storage tank contents. 20" dial in 3 x 10" case saves panel space. No outside power source needed; can be located up to 250 ft from tank. — THE LIQUIDOMETER CORP.

243—Control Valves—Catalog 1500-B—Illustrated—Describes complete line of Domoter, solenoid-operated and handwheel single seat control valves for handling difficult fluids under extremes of temperature and pressure. Offers full, unrestricted flow, positive plug and seat alignment and direction flow flexibility.—THE ANNIN COMPANY.

254 — Pilot Pressure Controller — Bulletin D-4 — Describes the dependable Wizard pilot, Series 4100 U, in a new gas type weatherproof case for flush or surface panel mounting, available with either bellows or Bourdon tube measuring elements for pressures from inches of water to 10,000 psi. — FISHER GOVERNOR CO.

267—Remote Liquid Level Indicator —How clear, brilliant readings

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427	433	437	440	452	456	505	506	507	511
513	519	520	527	566	570	598	613	614	622
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from any angle are possible with this unit is explained in Bulletin WG-1824. Pointer is always visible, even at extreme high and low water levels. Of manometric type with automatic temperature compensation. — YARNALL-WARING COMPANY.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

301—Metal Fabrication — Replacement parts for plant maintenance; Sheet, plate & light structural. Brochure describes engineering services for Southern industry. — ENGINEERING SALES.

302—Industrial Metals — Fact Folder 9D describes stainless steel sheet, plate, strip, rod, pipe, etc., immediately available for fast, accurate delivery.—REYNOLDS ALUMINUM SUPPLY CO.

305 — Industrial Heating — Catalog 50, 50 pages — Gives data on the type and size of electric heating units and similar equipment for industrial heating needs. Detailed diagrams and photographs describe applications.—EDWIN L. WIEGAND CO.

309—Elevated Steel Tanks — 16 p "Tank Talks" shows various types of tanks constructed and erected by manufacturer as well as stand pipes, reservoirs, storage and high pressure vessels, cylinders, etc. — R. D. COLE MANUFACTURING COMPANY.

319—Portable Band Saw — Bulletin describes the Kalamobile, a portable metal-cutting band saw. Has rubber-tired 12" wheels and telescoping handles. Capacity 6" rounds - 10" flat. — Machine Tool Div., KALAMAZOO TANK AND SILO CO.

326—Beam-Type Guardrail—Manual FB-3456 describes how Flex-Beam Guardrail protects danger spots along roads, highways, bridges, and in industrial plant locations. Installation photos, drawings, reference data, dimensions and physical properties. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

331—Storage Bins — Bulletin illustrates and describes Super-Concrete storage bins for industry. Lists of prominent users and varieties of materials are given. Contains tables of capacities and photographs of typical installations.—NEFF & FRY.

351—Steel Grating & Treads—Bulletin 2486 describes electroforged steel grating and treads, their advantages and typical successful applications.—BLAW-KNOX EQUIPMENT DIV.

363—Magnetic Separators — Catalog 910 covers wet concentration and magnetic recovery. Various types and sizes shown as well as typical installations and machines. — JEFFREY MFG. CO.

PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

406—Blow-Off Valves — Catalog B-434 describes the valve to use for boilers to 2500 psi. Disc has welded-in stellite facing and inlet nozzle has integral welded-in heavy stellite seat. — YARNALL-WARING COMPANY.

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319	326	331	351	363	406	407	413	421	425
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631	686	700	715	718	725	744	745	801	802
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407—Piping Materials—Bulletin reports on intensive investigation into problem of main steam piping materials and gives data on stress rupture characteristics of Types 316 and 347 stainless steel piping adjacent to welded joints. — PITTSBURGH PIPING AND EQUIPMENT COMPANY.

413—Reducing Valve — Bulletin 553 gives graphic performance comparison and capacity data of the new "Hi-Flo" valve for water reducing stations, fuel oil pressure control, process lines, etc. — LESLIE CO.

421—Air and Gas Traps — 8 page Bulletin No. 289 describes complete line of ball float traps for draining water from air, gas or steam lines or draining a light liquid from a gas under pressure (for pressures to 900 lb). Includes: installation, selection and ordering information. — ARMSTRONG MACHINE WORKS.

425 — Steam Trap with only three parts — cap, disc and body described in Bulletin 257. No valve closing mechanisms. Only moving part is solid stainless steel disc. Same trap for all loads and pressure 10-600 psi. — SARCO COMPANY, INC.

427—Diaphragm Valves — Valves for common and corrosive services described in Circular AD-1942. Have independent seating and bonnet sealing. — CRANE CO.

433—Insulation — Industrial glass fiber duct and pipe insulations described in Fact Folder 11. Stocks immediately available for fast, accurate delivery. — REYNOLDS ALUMINUM SUPPLY CO.

437—Piping for Permanence—Bulletin covers a variety of services where wrought iron pipe saves because it serves longer. Corrosion costs you more than wrought iron. — A. M. BYERS COMPANY.

440 — Jacketing "Check-Charts" — To help you estimate your aluminum jacketing requirements, manufacturer offers easy-to-use "Quick Check Charts" for .006, .016 and .020 jacketing. — ASEECO, INC.

452—Pipe and Tubes—42 page Bulletin 26 gives types of steel tubes, tensile, creep and rupture properties, welding and forming data, applications and other valuable data.—National Tube Div., UNITED STATES STEEL CORP.

456—High Alloy Castings & Pipe—Bulletin 3354G explains how static and centrifugal casting & pipe offer maximum resistance to heat and corrosion. — THE DURALOY COMPANY.

MAINTENANCE PACKING GASKETS, LUBRICATION

505—Metal Cutters — Bulletin 655 shows actual cost figures on various metal cutting jobs (bolt, rod, wire, chain, etc.), by using cutters, hand and power-operated cutters.—H. K. PORTER INC.

506—Gage Glass Cleaning Tool — Data sheet No. 301 describes tool which uses brushes to quickly and efficiently clean inside of liquid level gage glass.—JERGUSON GAGE & VALVE CO.

507—Power Sweepers — Folder describes the "704," a compact unit for small plant budgets; designed for congested areas and narrow aisles; gasoline, LP gas or battery powered. — WAYNE MANUFACTURING COMPANY.

511—Maintenance Ideas—"Genius at Work" — Contains ideas about plant maintenance, bits of philosophy, new products, and a description of the company's line. — KANO LABORATORIES.

USE SPI READER SERVICE

513—Conveyor Belt Repairs — Bulletin R-700 and Folder R-4 describe the "Rema" method of making vulcanized repairs without heat. Holes, gouges, rips and tears can be repaired on the job. Curing time delay is eliminated. Belts can be put into service immediately after repair is made.—FLEXIBLE STEEL LACING COMPANY.

519 — Sealing Compound — Data sheet describes Tite Seal for leakproof, pressure-tight connections. Gasket and joint compound heat and vibration proof. Prevents rust and corrosion. — RADIATOR SPECIALTY CO.

520—Lubrication Manual — Selection & application of right lubricant for 560 lubricated plug valve applications featured in 12-p manual. Service and temperature ranges tabulated. — WALWORTH COMPANY.

527—Wear-Free Packings — File No. DMSP describes complete line of metallic and semi-metallic packings. — DURAMETALLIC CORPORATION.

566—Tube Expanding — Bulletin 55 on torque control describes automatic air driven tube expander drive. Control assures uniformity of tube expanding. — THOMAS C. WILSON, INC.

570 — Multi-Purpose Grease — Bulletins describe new single product Gulfcrown grease (4 consistencies) that does the work of many — simplifies application and avoids errors, reduces inventory and cuts lubrication costs; grease gun or centralized system application. — GULF OIL CORPORATION.

598—Valve-in-Line Reseaters—Bulletins describe power-driven, one-man operated reseaters (pneumatically or electrically powered) for modern gate and globe valves. Reduces grinding time to minutes. Saves money on valve inventory and maintenance.—THE LEAVITT MACHINE COMPANY.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

613—Monorail Applications — Bulletin C-1 — "Handling Problems Solved" — gives hundreds of illustrations of monorail applications to handling problems in various industries. Equipment advantages also illustrated. — AMERICAN MONORAIL CO.

614—Vertical Transportation — Elevator Catalog — Describes and illustrates details of passenger and freight elevators, escalators, dumbwaiters, and modernization and maintenance equipment for use in industrial, utility and service plants. — OTIS ELEVATOR CO.

622—Pneumatic Conveyor Systems — 4 page Bulletin P58G describes many types of pneumatic conveyor systems for handling bulk materials. — NATIONAL CONVEYORS CO., INC.

631—Screw Conveyors—Catalog ID-541, 68 pages — Illustrates and describes standard and special types of conveyors, with engineering data necessary for selection. Tables give sizes, types, speeds, horsepowers and other information. Accessories included. — CONTINENTAL GIN COMPANY, INDUSTRIAL DIVISION.

686—Variable Speed Transmissions — 8 p illustrated bulletin describes Speed-Trol line with positive pulley adjustment. Gives data on factors in drive selection and varied automatic and remote speed control accessories. — STERLING ELECTRIC MOTORS.

WATER TREATMENT, HEATING VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

700—Water Conditioners — 4 p brochure describes Anco water conditioners for hot-water and humidi-

New Heating Problem?
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℞ Time-saving far-infrared heat

Your Chromalox Man has the ANSWERS

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Simply and precisely controlled, even over largest work areas.

Absorbed uniformly and quickly by practically all colors, even optically transparent materials.

All-metal, self cleaning.

High performance without high pressures.

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Immediate shipment of standard heaters. World's largest stock.

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Bulletins (Con'd)

fying systems. Stop rust and corrosion; prevent discolored water. — ANDERSON CHEMICAL COMPANY, INC.

715 — Amine Treatment — Return line corrosion is a critical problem in maintaining economical, efficient power plant operation. Bulletin CP-100 shows how amine treatment is an easy, effective and economical way to eliminate pipe corrosion problems. — THE BIRD ARCHER COMPANY.

718—Zeolite Softeners — 20 p catalog 4520 describes the sodium zeolite softening process in detail. Contains data required for proposals, lists factors important in selection of proper zeolite material and in sizing of equipment. Single valve controls all cycles of service and regeneration. — COCHRANE CORPORATION.

725—Cooling Tower — 32 p Bulletin DT-57-1 describes induced-draft counterflow cooling tower. Describes construction and operation of all major parts, effects of recirculation and surroundings. Illustrated. — FOSTER WHEELER CORP.

745—Dust & Fume Control — 40 p booklet gives helpful information on recovering dusts, fly ash, mists, fumes and other suspensions of gases. Summarizes important points design and plant engineers should know about electrical precipitators.—WESTERN PRECIPITATION CORPORATION.

774—Refrigerating Units — Bulletin 97-F illustrates and describes low-pressure refrigerating units. — FRICK CO.

ELECTRICAL

801—Motors—Bulletin describes and catalogs more popular a-c motors from 1 to 600 hp, for every process and manufacturing requirement. Single phase and polyphase; surpass NEMA specifications. — BROOK MOTOR COMPANY.

802—Small Relays—Simple solenoid design with only one moving part described in Bulletin 700. Silver alloy contacts need no cleaning, filing, or other maintenance. — ALLEN-BRADLEY CO.

804 — Electronic Ground Alert — Portable & stationary units detect line-to-ground faults immediately. Available for 220, 440, 2,300 & 4,160 volt underground systems. Form 255 gives details. — DELTA ENGINEERING SALES CO.

805—Power Factor Correction — 24 page catalog 50B shows how you can cut power costs by installing correction capacitors on motors and other inductive electrical equipment. Greater loads can be handled from existing circuits. Wiring, transformer and switchgear costs can be greatly minimized in new installations.—SPRAGUE ELECTRIC CO.

854 — Adequate Wiring — Booklet "Wire Ahead" — Discusses preventive maintenance in electrical systems — the symptoms of inadequate wiring—and plans for anticipating electrical demands. — ANACONDA WIRE & CABLE COMPANY.

871—Electrical Protection — Protection Handbook — Tells how to protect motors, apparatus and circuits. Gives National Electrical Code requirements in simplified form. Designed to help the electrical or plant maintenance engineer. — BUSSMANN MFG. CO.

873—Commutator Maintenance — 27 page booklet B-6150-A contains information on brush and commutator maintenance. Includes maintenance requirements, factors affecting commutation and carbon brush materials. — WESTINGHOUSE ELECTRIC CORP.

OPERATING AIDS SUPPLIES & MISCL.

906—Steel Measuring Tapes — Complete catalog describes full line of measuring tapes from 6 to 100 ft, including wide blade tape with upright measurements. — EVANS RULE CO.

909—Industrial Skin Cleanser—Folder describes Vi-Van Clean, a non-alkaline, non-acid, all-purpose antiseptic skin cleanser that prevents dermatitis and other skin conditions. Self-service dispensing units. — DAMERON ENTERPRISES, INC.

911—Rescue Kit — Bulletin 733 describes unit and procedure for freeing persons trapped in cars, buildings, under machines, in elevators, etc. — H. K. PORTER INC.

912—Visual Control — 24 page Booklet BH-10 describes how the Boardmaster Visual Control can help you get things done better and faster. Ideal for production, traffic, inventory, scheduling, sales, etc. Full price is $49.50 with cards. — GRAPHIC SYSTEMS.

KEEP UP-TO-DATE

See Pages 81-82

FUTURE EVENTS of Engineering Interest

March 13-14: American Institute of Electrical Engineers, Textile Conference, Georgia Institute of Technology, Atlanta, Ga.

March 17-21: 4th Nuclear Engineering & Science Conference & Exposition, Chicago, Ill. For information write Atomic Exposition, 117 South 17th St., Philadelphia 3, Pa.

March 26-28: American Power Conference, 20th Anniversary, Sherman Hotel, Chicago, Ill. Dr. E. R. Whitehead, Elect. Engrg. Dept., Illinois Institute of Technology, Chicago 16, Ill.

March 27-28: Oklahoma Utilities Association, Annual Convention, Biltmore Hotel, Oklahoma City, Okla.

March 27-29: American Institute of Electrical Engineers, Pulp & Paper Conference, North Carolina State College, Raleigh, N. C.

March 31-April 2: American Institute of Electrical Engineers, Southwest District Meeting, Tulsa, Okla.

April 1-3: Instruments & Regulators Conference, American Society of Mechanical Engineers, University of Delaware, Newark, Del.

April 9-11: Fifth Annual Conference on Accident Prevention Engineering, University of Florida, Gainesville, Fla.

April 14-15: Maintenance & Plant Engrg. Conference, American Society of Mechanical Engineers, Penn-Sheraton Hotel, Pittsburgh, Pa.

April 16-18: Natural Gasoline Assoc. of America, Annual Convention, Baker and Adolphus Hotels, Dallas, Texas.

May 1-8: 26th Annual Meeting, American Society of Tool Engineers, Philadelphia Convention Center, Philadelphia, Pa. Richard Gebers, Public Relations Mgr., ASTE, 10700 Puritan, Detroit 38, Michigan.

May 11-15: Oil & Gas Power Conference & Exhibit, American Society of Mechanical Engineers, Bellevue-Stratford, Philadelphia, Pa.

May 12-16: Southwestern Metal Exposition, State Fair Park, Dallas, Texas. W. H. Eisenman, Mgr. Dir., 7301 Euclid Ave., Cleveland 3, Ohio.

Is your plant CRITICALLY SHORT of WATER?

● You will make major water savings, reduce your costs, solve your problems of water supply or disposal and get HIGH OPERATIONAL EFFICIENCY with Niagara "Areo" Evaporative Heat Exchangers, After Coolers or Condensers for these important plant services or processes:

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- **COOLING ROLLS, WELDERS, DRAWING OR EXTRUSION DIES**
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High operational efficiency means: precise temperature for improved product and process quality control, heat removal at rate of input, simple operating conditions, real economy in upkeep, sustained full capacity.

Also it means cooling in a closed system with your product kept free from contamination or, when condensing, getting a pure condensate holding high quality in your product or material.

Niagara machines do the work of a cooling tower plus shell-and-tube coolers with a single machine that saves piping, water handling disposal and treatment expense and 95% of water consumed by contact cooling methods.

Write for Bulletin 129, 130, 132, 136R.

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2. The method of loading.
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Over a long period of years, we here at Neff and Fry have learned that a *strong bin* is only part of the storage problem.

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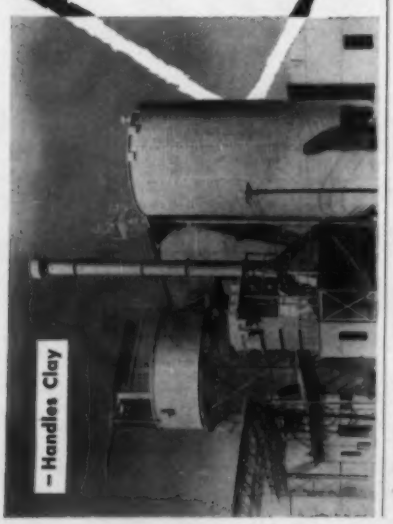
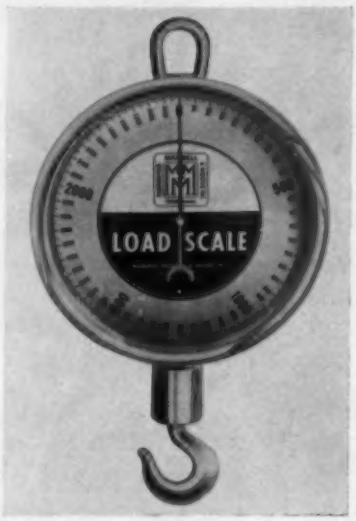
The difference is in the shape of the STAVE!



– Handles Clay

NEW Product Briefs



Load Scale

C-1 **Shaw-Box Crane and Hoist Division** of Manning, Maxwell & Moore, Inc., Muskegon, Michigan has announced the marketing of its new line of MMM Load Scales.

Picking materials up, moving them to a stationary scale, setting them down, recording their weight and then picking them up again means double handling and increased labor cost. With the MMM Load Scale, weighing and handling are performed in one time-saving operation.

Inventory of bulk materials by weight goes easier and faster with Load Scales. They also promote greater safety by warning against overloading of hoisting equipment.

The MMM Load Scale (weighs only 42 lb) is accurate to within 2/10 of 1% of the full scale reading. The mechanism is sensitive to weight changes of less than ½ of one division.

Steam Jacketed Chemical Pumps

C-2 Steam jacketing for its line of Fig. 3715 chemical pumps has been announced by **Goulds Pumps, Inc.**, 38 Black Brook Rd., Seneca Falls, New York. Savings in power, process water or product often result from raised temperature of pumped liquids.

Steam jackets permit use of Fig. 3715 chemical pumps for handling aqueous salt solutions where higher pumping temperatures permit greater amounts of solute to be dissolved. When the entire system is heated to maintain the solubility advantage, jacketing of the pump prevents precipitation and attendant clogging, shaft scoring or seal damage.

Jacket is available on all sizes and in all constructions of Goulds Fig. 3715 pumps for steam pressures to 100 psig or 338 F saturated steam. Jacket is of fabricated steel, asbestos gasketed, bolted to a remachined casing cover and provided with a ½" pipe tap inlet and drain connection.

Goulds Fig. 3715 chemical pumps provide the process industries with centrifugal pumps especially designed for handling acids, alkaline liquor, water and slurry service. Appropriate materials of construction are available depending on the corrosive or abrasive qualities of the material being pumped.

Tripod Vise Stand

C-3 A new and versatile tripod vise stand for ⅛ through 5 in. diameter pipe has been announced by **The Erie Tool Works**, Erie, Pennsylvania.

The new chain tripod vise, called the 2 PSC, features a side handle, permitting the user to tighten the

chain without any danger of hitting the legs or base. Better leverage is achieved, making the unit easier and faster to operate. There are 5 jaws; two front, two back, and a center jaw which prevents bending of small diameter pipe. The front and rear jaws are reversible for double jaw life.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 81

Transfer Valve

C-4 **A. W. Cash Company,** Box 551, Decatur, Illinois, has developed a new transfer valve for duplexing two strainers, heat exchangers or other equipment where fast and smooth transfer of flow from one unit to another is required.

The Cash Standard Type 45 valve has six ports, including a common inlet and outlet. Flow is through the single inlet, to either of two pieces of equipment, and out the common discharged connection.

Design provides transition of flow from one unit to the other on a proportional basis, assuring a continuous flow during transfer.

A single operating handle jacks up the plug before rotation so that transfer can be made effortlessly. The plug cannot be rotated until it is clear of the seat, and an indicator shows position of the plug at all times. The handle also features an adjustable caming device to properly seat the plug.

The Cash Standard Type 45 valve is available in two sizes: 1" 600 lb flanged, and 1½" 150 lb flanged, with other sizes available upon application.

Vapor Condenser

C-5 **Niagara Blower Company,** 405 Lexington Ave., New York 5, N. Y., has developed a new Aero Vapor Condenser, using the principle of evaporative cooling with rejection outdoors of the heat of condensation.

Vapors are condensed in two parallel-mounted, water sprayed coils enclosing a central plenum under the fan section. The air stream enters above the coils, travels downward over them and enters the plenum, where it drops its entrained moisture, and passes up and out thru the fan. The spray water is recirculated; only a small amount of it is consumed (1000 Btu per lb of water evaporated, plus a small wastage).

Condensate is recovered by draining it into a manifold where a screening baffle tube separates out the non-condensibles. Non-condensibles gases are sub-cooled by seven or eight degrees and ejected by a steam ejector or a vacuum pump. Vapor mixed with non-condensibles is condensed and returned thru reflux tubes.

Condensing temperature may be low, within 20 F of the ambient wet-bulb, and a high vacuum is economically maintained. Power and steam are saved.

Applications of the Niagara Aero Vapor Condenser are to replace barometric type condensers when needed to conserve water, steam or power or provide a higher vacuum to improve processes.

Pipe Cutting & Beveling Aid

C-6 **The H&M Pipe Beveling Machine Company,** 311 E. 3rd, of Tulsa, Oklahoma, has announced the addition of the new Flexible Shaft to their line of accessory equipment, made to fit any size in the H&M Pipe Cutting and Beveling Machine line.

The Flexible Shaft is designed to allow complete visibility of the cutting or beveling operation. It is made from a length of flexible tubing, with a crank handle attached to one end of the tubing and the other end attached to the crank pinion on the machine. As the operator turns the crank, the ring gear is put in motion, and the torch begins its revolution around the pipe.

This attachment is especially useful when cuts or bevels are being made on the larger sized pipe, where the operator has difficulty watching the cut from his normal position.

With the Flexible Shaft, the operator can stand in any position and observe the cut through the full circumference of the pipe.

Welded Fittings for Substation Connectors

C-7 New "DuraWELD" fittings, for welded construction of aluminum bus, have been developed by **Anderson Electric Corporation,** 700 N. 44th St., Birmingham 1, Alabama.

The new fittings save time and steps in bus fitting and are less expensive than bolted fittings. They eliminate the need for accurately cutting and fitting bus together, as the connectors serve as "welding jigs" for proper aligment and construction.

Once a "DuraWELD" fitting is properly welded in place, it insures a permanent, trouble-free connection, because the fitting becomes an integral part of the bus.

Prices average 20-70% less than bolted fittings. The new fittings are recommended for big jobs which justify welding.

High Visibility

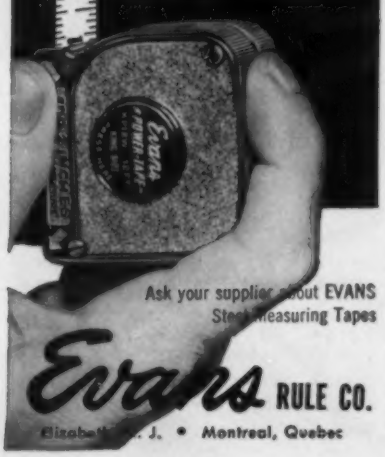
EVANS

STEEL MEASURING TAPES

MEAN GREATER ON-THE-JOB SPEED AND ACCURACY

Evans flexible steel measuring tapes shave seconds from every measuring job. Jet black markings on snowy white background give exact readings at a glance. Big, easy-to-see numerals show both inches, and feet-and-inches. There's an Evans tape in every size and shape . . . at prices that mean economy. Best of all, Evans blades are replaceable quickly, easily.

Tapes may be supplied with your company name plate, if desired, to give to your customers as a wonderful good-will builder!



Ask your supplier about EVANS Steel Measuring Tapes

Evans RULE CO.

Elizabeth, N. J. • Montreal, Quebec

New Product Briefs (Continued)

Dielectric Test Set

C-8 For measuring direct current at voltages up to 100 kv when applied to the insulation of electrical equipment such as generators, transformers, bushings, cable, etc., the **James G. Biddle Co.**, 1316 Arch St., Philadelphia 7, Pa., has developed new dielectric test equipment.

The new Model 2 (illustrated) offers utmost safety, simple operation and reliable performance. It has excellent output voltage regulation and facilities for voltage and leakage current measurements.

In the Model 1A, 40 kv set and the Model 2, 100 kv set, a polarized primary is incorporated, which prevents the set from being raised above ground potential. A reset button prevents the high voltage output to be energized without the operator's knowledge.

Plant applications include: nondestructively detecting unreliable condition of insulation of new or repaired electrical equipment and preventive maintenance tests on important rotating equipment, cable, switchgear, etc.

Bulletin 22-25 gives complete applicational information.

Heavy Duty Impact Wrench

C-9 Latest in reversible impact wrenches offered by **Cleco Div. of Reed Roller Bit Co.**, Box 2119, Houston 1, Texas, is the new Model A-30-SA which delivers considerably more power than previous models. It performs equally well in tightening and removing bolts, nuts and screws and in stud-setting and tapping.

This heavy-duty tool has a remarkably fast rundown. It utilizes a two-hammer impact mechanism which affords excellent balance with minimum vibration. It is compact and light in weight.

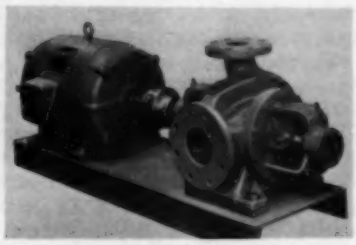
The tool is offered with ½" square shank or Integral Quick Change Chuck and with 3" and 6" Spindle Extensions, all having ⅜" bolt capacity and 5/16" tapping capacity. A complete line of accessories is available.

High Pressure Control Valve

C-10 **A. W. Cash Company,** Box 551, Decatur, Illinois, has developed a new high pressure control valve specially designed to handle gases and liquids in high pressure drop, on-off or throttling service, with dead-end shutoff.

Known as the Cash Standard Type 505, the new split body construction valve has a pressure and temperature rating of 10,000 psi at —40 to 400 F. It is available with a direct or reverse action actuator with standard 3-15 and 6-30 PSI instrument air range.

Body is forged stainless steel with hardened stainless steel trim. Connection sizes are ½" and ¾" NPT. Connections for high pressure tubing are also included.



Boiler Feed Pump

C-11 Extra long service life is claimed for new turbine type, 1750 rpm, two-stage, center-mounted, boiler feed pump line announced by **Fred H. Schaub Engineering Co.,** 2110 S. Marshall Blvd., Chicago 23, Ill.

Features include impellers with surface hardness of 1100 Brinnell to resist erosion, double row permanently lubricated ball bearings, balanced radial shaft loading, overstrength case, improved "dry-running" Fleximatic shaft seals with pressure-relieved "boxes." Design also permits, for the first time, "pulling" shaft seals from end of shaft through bearing aperture without dismantling pump.

Capacities to 150 gpm; pressures to 300 psig. Bulletin 65 gives complete description, dimensions, and performance data including "unfavorable" 7 ft and 3 ft NPSH operating conditions.

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FOR NON-LUBRICATING AND CORROSIVE FLUIDS

You asked for it . . .

and Eco is the only manufacturer who has made it available. The first self-priming rotary gear pump suitable for non-lubricating and corrosive fluids is now available for immediate delivery. The pump, with ¾" P.T. inlet and outlet ports, features housings of 316 or Carpenter 20 stainless steel, Hastelloy C or nickel, with reinforced Teflon gears and internal Teflon bearings and packing.

Designated the GearChem,* this pump is suitable for speeds to 1750 rpm at capacities to 10 gpm and pressures to 100 psi. Viscous media to 5000 SSU can be pumped at reduced speeds.

The GearChem created tremendous interest at the recent Chemical Show. In addition to proportioning and metering applications the pump is ideal for general process work in pilot plant and production operations.

Write for prices and complete information.

* T.M. Applied For

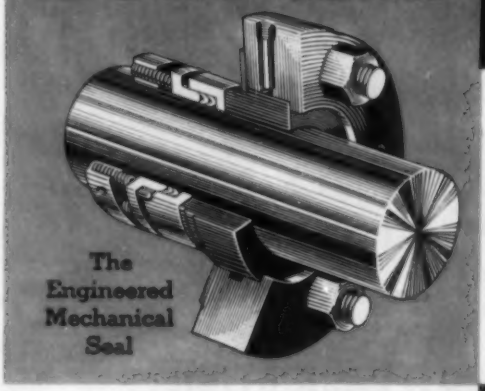
Teflon—duPont trademark

ECO
the big name in small pumps
MArket 4-6565

ENGINEERING CO.
12 NEW YORK AVE.
NEWARK, N. J.

The Mechanical Seal That Beats Corrosion, Temperatures, Pressures and Speeds

DURA SEAL



Because Dura Seal rotary mechanical seals are made of any machineable metal alloy, they are engineered to provide perfect sealing in the presence of highly corrosive process fluids at high speeds, pressures and temperatures.

WRITE TODAY FOR YOUR COPY OF THIS NEW BOOKLET ON MECHANICAL SEALING— illustrating and describing Types of Dura Seals adaptable for meeting various sealing conditions.

DURAMETALLIC CORPORATION
KALAMAZOO, MICHIGAN

EXTRA YEARS
OF MORE DEPENDABLE POWER
and at less cost per pound of steam

TODD BURNERS
GAS OR OIL

PRODUCTS DIVISION
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PLANT:
Green's Bayou, Houston 15, Texas

TODD NEW YORK, U.S.A.

Equipment, Supplies & Methods (Cont'd)

Tube Expansion Control

C-12 The **Airetool Manufacturing Company,** Springfield, Ohio, has introduced a new pneumatically operated Airetrol Tube Expansion Control.

The new instrument automatically controls tube expansion by accurate measurement of torque, rolling up to 12 tubes per minute to uniform accuracy.

Airetool completely eliminates guesswork in tube rolling by combining air-motor drive with a precision control that measures torque output.

Accurate to within .001 of an inch, the control automatically stops expansion according to a predetermined setting .This results in uniformly tight tube joints with no over expansion or under expansion.

It positively insures maximum tightness and holding strength in every tube joint in the condenser or heat exchanger, and also prevents distortion or breakage of ligaments in the tube sheets.

Models are available for tube sizes ranging from ¼" to 1½" O.D. Bulletin 64 gives engineering details.

Explosion-Proof Motors

C-13 Designed to eliminate fires or explosions when motors must be operated in combustible or explosive atmospheres, a new line of totally-enclosed explosion-proof motors is being marketed by **Fairbanks, Morse & Co.,** 600 S. Michigan Ave., Chicago 5, Ill.

Offered in both fan-cooled and non-ventilated models (non-ven-

tilated illustrated), these F-M motors are all manufactured in strict accordance with latest NEMA standards, and bear the Underwriters Laboratories Approved Labels for use under the following hazardous conditions: Class I, Group D — Atmospheres containing gasoline, petroleum, naptha, alcohol, acetone and lacquer solvent vapors and natural gas; Class II, Group E — explosive metal dust such as magnesium; Class II, Group F — coal, coke or carbon black dust; and Class II, Group G — grain dust.

Type KZCX Explosion-Proof fan-cooled motors, manufactured in ratings of 1½ to 30 hp incorporate an extremely efficient cooling system.

Trapped clean air within the motor enclosure is transferred by rotor action to the large frame and bearing arm surfaces. A cooling air stream, supplied by an external aluminum fan, is directed by a fan shield over the motor surface to dissipate this heat. The air stream is confined close to the surface of the motor to eliminate hot spots, and prevent the accumulation of dust and dirt. The numerous small openings on air intakes provide for an ample flow of cooling air, but prevent large foreign objects from being drawn in by the fan.

Fairbanks-Morse Type KZEX Explosion-Proof, non-ventilated motors, made in 1½ hp ratings and lower, are uniformly cooled through convection and natural radiation, provided by rotor action and the large ratio of frame surface area to volume. This model, except for the absence of an external fan and fan shield, is identical in construction to the F-M Type KZCX Explosion-Proof Motor.

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DIXISTEEL
TRADE MARK
BARS AND SHAPES

The name DIXISTEEL may be new to you, but to many of our customers it is as well known and respected as the word *sterling* on silver.

There is never a question about quality when the bars and shapes you buy bear the name DIXISTEEL.

From molten steel to finished products every operation is checked and re-checked by metallurgists, chemists and specialists, to make sure of proper physical characteristics, finish and tolerance.

Specify DIXISTEEL bars and shapes—plain or galvanized—and be sure of the finest quality.

MAKERS OF DIXISTEEL SINCE 1901

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TRinity 5-3441

For more information, use Reply Card—Page 81

New Product Briefs (Continued)

This picture shows representatives of Georgia Power Company viewing G-E's new weather-protected motor at a demonstration in Atlanta.

Weather-Protected Motor

C-14 A completely redesigned NEMA Type II a-c weather-protected motor in ratings from 250 hp and up was recently introduced by **General Electric Co.** High-up air intakes help guard against flooding or entry of ground-level dirt; lightweight removable bearing cap simplifies bearing maintenance; and new end shield offers more than 300-degree accessibility for inspecting and cleaning windings.

The lower half of the new motor is completely closed and air is circulated by fans on the rotor. Incoming air is kept clean and dry by means of multiple right-angle turns in low-velocity passages and an oil coated air filter in the upper (top hat) section.

Straight air passages connect the intake opening on one side with the intake opening on the other side, and the same is true with the exhaust openings. This provides a 100 per cent "blow through feature" which will allow wind to pass through the top section unobstructed. This prevents back pressure within the motor and allows it to ventilate itself properly. Rain trapped by the right-angle bends, drains out the side of the top hat section. Heater elements inside the motor housing guard against condensation during non-operating intervals.

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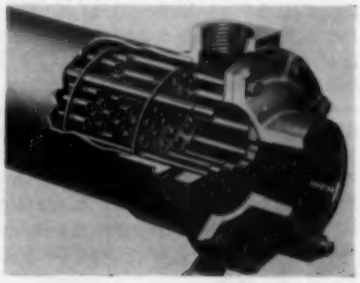


Standardized Exchangers

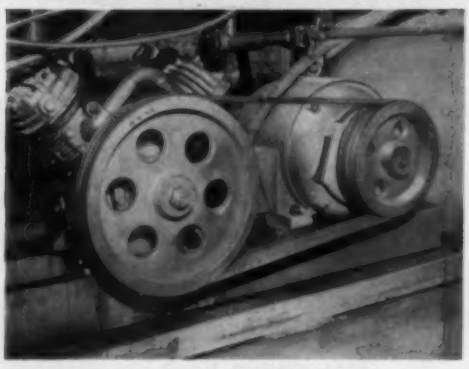
C-15 An expanded line of Type BCF Exchangers, with improved performance, new design features and new materials is now available at lower prices from the **Ross Heat Exchanger Division** of American-Standard, Buffalo 5, N. Y.

The 1958 BCF is offered in 46 sizes; one, two and four pass designs; and 1.2 to 124 sq ft of heat transfer surface. Fully pre-engineered and carried in stock, the new line embodies numerous improvements, including: New baffle structure with flanged lip at each tube hole and around outer edge to give tighter tube fit and improved thermal characteristics; stamped steel feet movable in three positions around hubs for easy, more adaptable mounting; hubs relieved under connections for unrestricted flow; corrosion resistant copper alloy core assembly and cast iron bonnets.

Designed for cooling lube oil, jacket water, hydraulic and other fluids, as well as many process heating applications, the new Ross BCF answers the requirements of many industries.

TEAMWORK!

BROOK A. C. MOTORS AND YOUR COMPRESSORS



BROOK A. C. MOTORS provide a smooth flow of power to compressors regardless of climatic conditions. Brook Motors, 1 to 600 HP, cost less initially and assure maximum service life and overall economy. There is no finer motor built. They're powering air and gas compressors from Arabia to Wyoming, stacking up splendid performance records. There's a Brook Sales and Service Headquarters near you. Send for literature.

SINCE 1904

world's most respected motor

BROOK MOTOR CORPORATION

3553 W. PETERSON AVE., CHICAGO 45, ILL.

BROOK MOTOR CORPORATION

Southern News Briefs

(*Starts on Page 6*)

New Merchandise Sales Head for Fort Worth Steel & Mach.

Fort Worth Steel & Machinery Company has announced the election of **Fremont Fisher**, formerly of Kenosha, Wis., as vice president in charge of the firm's merchandise sales department.

Fisher succeeds **M. S. (Moody) Jackson, Jr.**, recently appointed assistant to FWS&M's president, G. A. Jaggers.

In his new post, Fisher manages the Fort Worth, Texas, firm's national distribution system for marketing its standard industrial products — which include mechanical power-transmission equipment (V-belts, sheaves, roller-chain sprockets) and bulk-materials-handling machinery (screw conveyors and industrial fans).

Fisher's career covers more than 23 years' experience as a salesman and sales executive. Before joining FWS&M he was general sales manager of Howard Industries, Inc., Racine, Wis., manufacturer of fractional horsepower motors and gasoline generators.

For 11 years Fisher was with the Howe Scale Company, leading manufacturer of industrial scales, automatic electronic and electric batching systems and material handling equipment.

Trane — Oklahoma

The Trane Company has announced the promotion of **Gene H. Binning** to branch office manager of the firm's **Oklahoma City** territory. Trane is a major manufacturer of air conditioning and heating equipment with home offices in La Crosse, Wisconsin.

American Air Filter — Tenn.

C. W. Dean and Associates, Memphis, Tenn., manufacturers representatives, have expanded the line of products represented by the firm to include American Air Filter Company's air filter and engine and compressor products. These are in addition to AAF's dust control, Herman Nelson unit ventilator, and Herman Nelson heating and ventilating products, which Dean has represented for years in the Memphis area.

Universal P & G — Houston

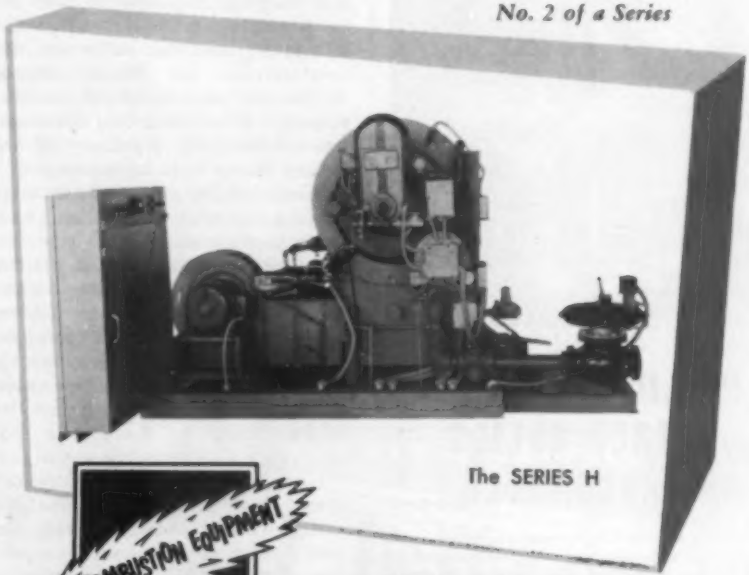
George E. Montgomery, with **Universal Packing & Gasket Company** for five years, has been appointed Sales Manager of the Houston firm. Previously a salesman with Universal, his experience includes two years as the company's California representative and several years handling OEM and industrial accounts in Universal's Houston and eastern territories.

Bendix Digital Control Systems — Southwest

Pacific Division of **Bendix Aviation Corporation** has announced the appointment of the **William E. Brice Co.**, 303 Bastrop St., Houston 3, Texas, as sales representative for Electro-Span digital supervisory control systems.

The Houston firm will handle Electro-Span sales in **Texas, Arkansas** and **Louisiana.**

No. 2 of a Series



COMBUSTION EQUIPMENT
ENGINEERED By THE WEBSTER ENGINEERING COMPANY

PACKAGED COMBUSTION by Webster

Gas, Oil or Combination Packaged Forced Draft Burner for either conventional or pressure firing of scotch marine boilers. Special assemblies and larger sizes available for water tube boilers. Flame retention gas ring insures stable operation over full range.

13 standard sizes from 60 to 500 horsepower.

Write for Series B13 Literature

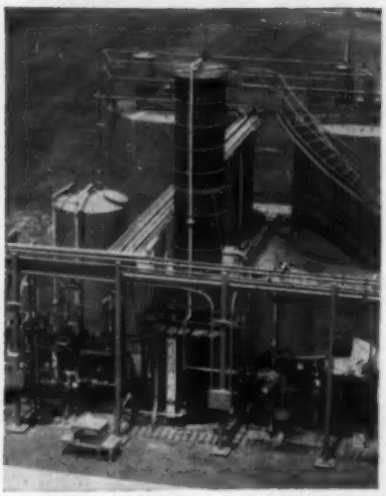
The **WEBSTER ENGINEERING** *Company*

TULSA 16, OKLAHOMA

Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio

ILLCO-WAY

ionXchange



"SILICA: 0.003 PPM, OTHER SOLIDS UNMEASURABLE..."

With some doubt as to the outcome, the de-ionization units pictured above were installed outdoors at a Texas power and light company, to replace evaporation equipment as a means of purifying feed water for a high-pressure boiler. After three years, results far exceeded guarantee and expectations. From raw water containing 27 ppm of silica and dissolved solids totaling 365 ppm, the quality of the effluent is reported as: "Silica, zero to 0.005 ppm, average 0.003 ppm. Other solids are unmeasurable."—This is a good example of what modern ILLCO-WAY ionXchange can accomplish.

BOILER FEED WATER FOR POWER PLANT

The particular plant shown above consists of a cation exchanger, an aerator, and a mixed-bed de-ionizer. The large tanks in the background hold a supply of regenerants. Operation is manual throughout, a preference of the purchaser. *Results have proved even more economical than expected.*

ionXchange

ILLINOIS WATER TREATMENT CO.

ILLCO-WAY

840 CEDAR ST.
ROCKFORD,
ILLINOIS

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Ont.

Southern News Briefs (Continued)

Electronics-Controls Div. for Cooper-Bessemer

The formation of a new Electronics-Controls Division is announced by Ralph L. Boyer, Vice President and Director of Engineering for **The Cooper-Bessemer Corporation,** Mount Vernon, Ohio. The new division will be headed by **Reed D. Hamilton.**

The anticipated trend to automation of power and compressing operations by pipeline, petrochemical and industrial plants served by Cooper-Bessemer has initiated the Company's decision to create this new division, Mr. Boyer explains. Within the next 10 years, for example, it is expected that the major gas transmission pipelines in the United States will be automated.

Cooper-Bessemer has been engineering satellite semi and fully automated systems for the past several years. By the use of the automated systems, it has now become practical to start up engine-driven or electric motor-driven compressors, load the compressors onto the pipeline, regulate compressor capacity within precise limits, cut the compressor out of the pipeline and ultimately shut down the entire unit.

Some of the newest automated systems utilizing Cooper-Bessemer compressors provide for remote control regulation of an entire compressor station without attendants of any kind by microwave signals from distant control centers.

One principal advantage of automatic control is the simple ability to operate both engine and compressor equipment at peak efficiency. Since response of automatic controls to changing load condition is almost instantaneous, maximum economy in fuel and operating cost is more easily attained.

C. E. Davies Retires from A.S.M.E. Post

After 38 years of service to the Society, including 23 years as Secretary, **C. E. Davies** has retired from The American Society of Mechanical Engineers. **O. B. Schier, II** succeeds Mr. Davies, who will continue to serve the engineering profession as coordinator for the United Engineering Center.

Oakite Establishes Mid South Division

To meet the expanding cleaning and metal treating needs of Southern industry, **Oakite Products, Inc.** have established a new Mid South Division with headquarters in the Commonwealth Bldg., 4th & Broadway, **Louisville, Ky.**

Victor L. Baltzell, for fifteen years an Oakite field representative in Dallas, has been selected as manager of the new division. In his new position he will be responsible for the field representatives and warehousing facilities in the areas of Cincinnati, Nashville, Evansville, Knoxville, Louisville, Little Rock, Jackson, Shreveport, New Orleans, and Memphis.

Armco Drainage — Dixie Div.

The Dixie Division Office and Georgia Sales Office of **Armco Drainage & Metal Products, Inc.,** is now located in new modern headquarters at 1874 Peachtree Rd., N.W., Atlanta 9, Georgia. **Warren S. Mann** is vice president and division manager.

C & D Batteries — Baltimore

C & D Batteries, Inc. has appointed **Edward H. Gossling, Jr.** as new salesman in the Baltimore territory.

The Conshohocken, Pa. firm manufactures industrial storage batteries for powering electric lift trucks; for the telephone industry; for railroads, mining, control, and other industrial applications.

In his new assignment, Gossling will work out of C & D Batteries' Philadelphia sales office, Charles F. Gross Associates.

Richmond Expansion for Reynolds Metals

A six-million-dollar research and office building will be erected in Richmond, Virginia by **Reynolds Metals Company**, and the aluminum firm's general sales offices will be moved to Richmond from Louisville, Ky.

Richard S. Reynolds, Jr., president, said that the new research building will be constructed on a site adjacent to the $10 million building, now nearing completion, which will house the company's executive offices. The research building will house packaging and metallurgical laboratories which already are in Richmond as well as other company research facilities.

About 750 people will be affected by the transfer of the sales headquarters to Richmond. The decision to move the sales force was based on the need to consolidate all the company's managerial activities at one location. The move will be made gradually and probably will be completed in 1959.

The decision to build the research center in Richmond means the termination of Reynolds' plans to erect a research center and office building in Louisville.

The company's eight manufacturing plants in Louisville will not be affected by the transfer of the sales headquarters. The long-range outlook is that total employment by Reynolds will continue to rise in Louisville, despite the shifting of sales activities to Richmond.

Safety Conference at Univ. of Fla.; April 9-11

The Fifth Annual Conference on Accident Prevention Engineering will be held April 9 - 11, 1958 on the University of Florida campus in Gainesville, Fla.

Donald B. Wilcox, professor of industrial engineering heads up the conference and **W. R. D. Nickelson** of the engineering and industrial Experiment Station of the University is conference coordinator.

Special features include demonstrations of fire hazards and alarm systems, sessions on eyesight conservation, industrial disaster planning and other technical problems.

Allis-Chalmers — Miss.

The Cabell Electric Company, 424 South Parish Street, Jackson, has been appointed a distributor for **Allis-Chalmers** distribution and instrument transformers, and an agency for Allis-Chalmers feeder voltage regulators and power transformers in all of Mississippi except that part of the state north of a line between Columbus, Oxford and Clarksdale.

J. B. Cabell is vice president and general manager of the Cabell Electric Company, which was established in 1919. Other principles include **W. M. Berry**, treasurer, and **Hartwell Cook**, sales manager.

Houdaille Industries

Gerald C. Saltarelli has been elected to the newly created position of Senior Vice President of **Houdaille Industries, Inc.**

In his new position, Mr. Saltarelli will have administrative responsibility for all Houdaille manufacturing plants and units. Prior to his election, Mr. Saltarelli was Vice President in charge of operations.

Coming in May...

The 12th annual Southern Plant MAINTENANCE ISSUE will feature "Plant-Tested" procedures, including equipment modernization and replacement, to reduce maintenance costs, prevent waste and improve operations. Feature articles will be written exclusively for S.P.I. by engineers and executives in Southern and Southwestern industrial and power plants, explaining problems they have had with equipment maintenance and the methods they have used to overcome these problems. This material will be "practical help" for the man in the plant.

Among the leading articles will be specific data on maintenance of:

Piping and Valves
Buildings and Equipment
Materials Handling Equipment
Electrical Equipment
Mechanical Equipment
Production Machinery
Refrigeration, Air Conditioning
Power Transmission
Water Treatment Systems
Steam Equipment
Internal Combustion Engines
Pumps and Compressors

The editorial pages will also include a special section on new equipment and supplies, listings of new tools and repair products.

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BULLETIN 143

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Southern News Briefs (Continued)

A-C Southern Agencies

Allis-Chalmers Manufacturing Co. has appointed two new agencies in Oklahoma City for its feeder voltage regulators — **Electric Supply of Oklahoma, Inc.,** 113 N.E. 10th Street, and the **Southwest Electric Co.,** 2617 South Agnew Street, both in Oklahoma City, Oklahoma.

The Electric Supply of Oklahoma is serving as an agency for Allis-Chalmers feeder voltage regulators in 23 Oklahoma counties while Southwest Electric Company is covering nine counties in the state.

The Electric Supply of Oklahoma is headed by **William Mee** and has been a distributor for Allis-Chalmers transformers, control and motors since December, 1956.

J. A. Phares is president and general manager of the Southwest Electric Co., which has been a distributor for other Allis-Chalmers electrical equipment since 1946.

The Sikeston Motor and Transformer Co., Inc., Sikeston, Missouri, has been named an agency for **Allis-Chalmers Manufacturing Co.'s** feeder voltage regulators and a distributor for A-C motors and transformers in counties in southeastern Missouri, southern Illinois, northwestern Tennessee, and southwestern Kentucky.

William O. Comstock is president, and **Thomas U. Clark** is vice president and manager of Sikeston Motor and Transformer Co., which was established in June, 1957.

Southeastern Reps. for Lake Shore Electric

Appointment of three representatives to handle the company's line of electrical equipment has been announced by **Lake Shore Electric Corporation,** Bedford, Ohio.

These include **The Herbert J. Baer Co.,** P. O. Box 131, Richmond, Virginia. Baer will represent Lake Shore in **Virginia.**

The **C. B. Rogers Co.,** P. O. Box 1376, Clearwater, Florida, will cover the entire state.

Roger Allen, C. B. Rogers & Associates, 1000 Peachtree Street, N.E., Atlanta, Georgia, will represent the company's complete line in **Georgia** and **South Carolina.**

Lake Shore Electric Corporation is well known for its line of switchboard and power distribution systems; diesel generator controls and marine switchgear. More recently the company announced a new, safety - type automatic transfer switch; a diesel generator start cabinet with protective relays; and a floor mount diesel generator control cabinet for service to 250 kw, 440 v.

Western Gear — Ga. & Fla.

Western Gear Corporation has announced the appointment of **Gene F. Scarbrough,** who will represent the company in Georgia and Florida. With offices at 267 E. Paces Ferry Road N.E. in Atlanta, Georgia, Scarbrough will handle Western Gear's line of power transmission equipment including gear reducers, high speed units, StraitLine units as well as other special machinery.

Western Gear, a West Coast firm, has plants at Seattle, Wash., San Francisco, Belmont, Lynwood and Pasadena, California and Houston, Texas.

Edison Electric Institute

Walter B. Gesell has been appointed Director of Economics of the **Edison Electric Institute.**

Mr. Gesell, who is retiring as Vice President in Charge of Operations for the Oklahoma Gas and Electric Company, Oklahoma City, has been closely associated with the electric utility industry for more than forty years. He accepted the EEI appointment on a short-term basis to head up the Institute's newly established Economics Department.

Byron Jackson — Ala.

Norman D. Jesse, vice president of **Byron Jackson Pumps, Inc.,** a subsidiary of Borg-Warner Corporation, has announced the opening of a new district office in **Birmingham, Alabama.**

The office, located at 2031 Ninth Avenue South, is under the direction of **E. J. Dailey.** It combines sales and application assistance on the full line of Byron Jackson centrifugal pumps.

The new Birmingham office is under the jurisdiction of the Southeast Regional office directed by **Hugo Baldelli.**

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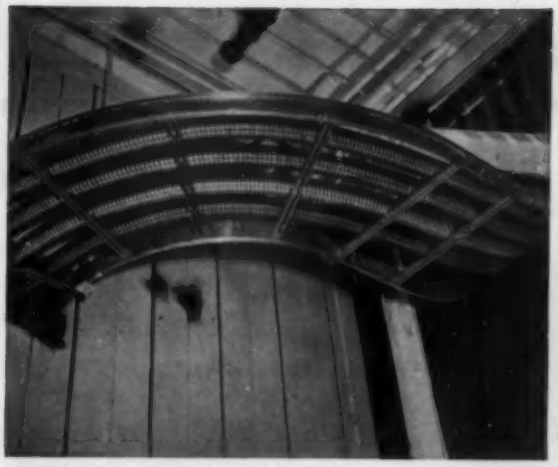

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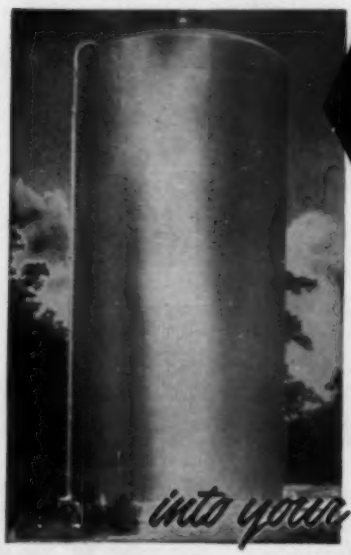

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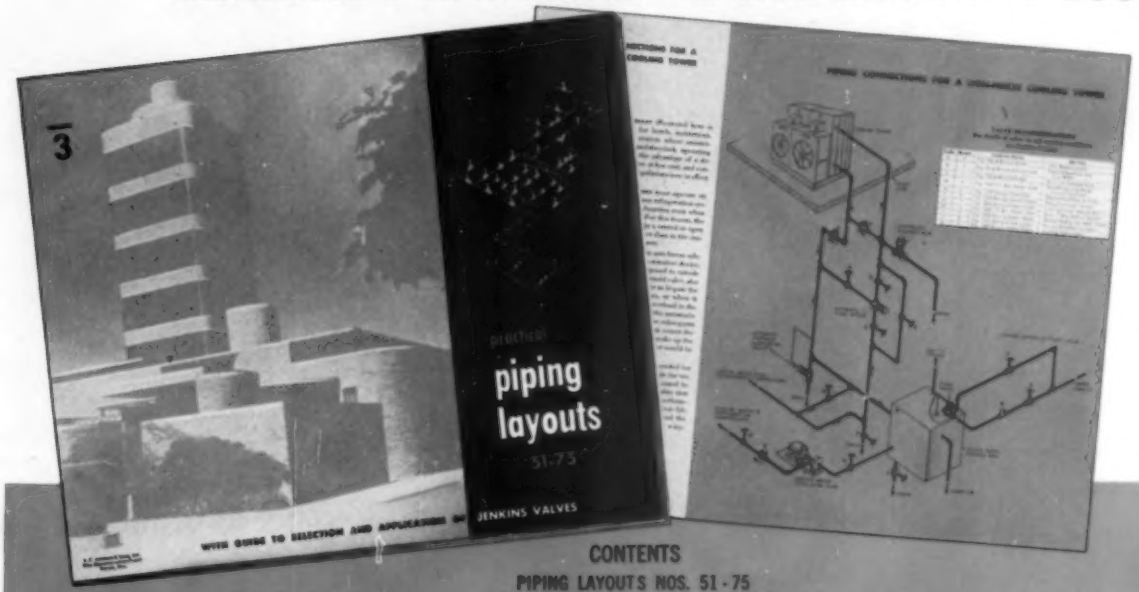

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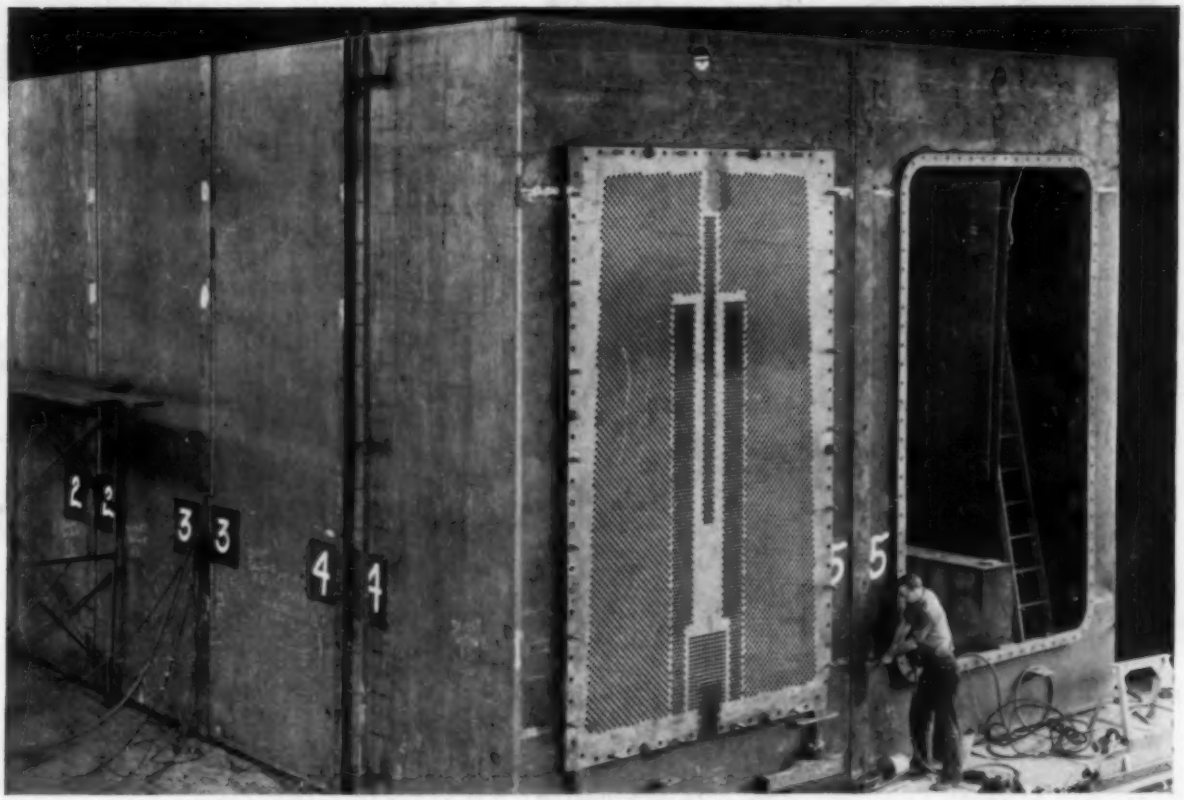

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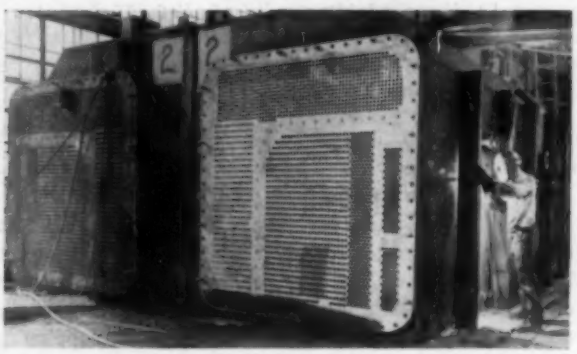

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